IPC Series

BOX-PC
for BX110n Series

# User's Manual

CONTEC CO.,LTD.

# Check Your Package

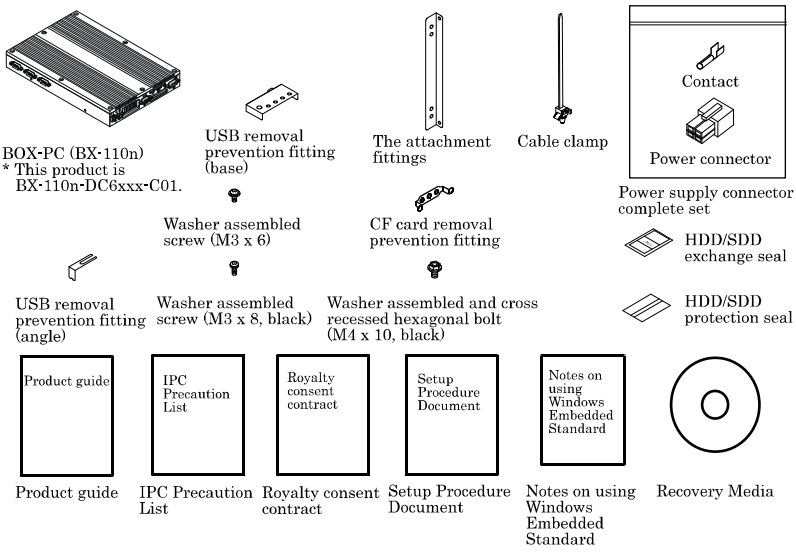
Thank you for purchasing the CONTEC product.
The product consists of the items listed below.
Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.
If you use IPC-SLIB-01 (driver&utility software set), download it from the CONTEC's Web site.
Product Configuration List

| Name | BX-110n-DC6000-C01 Pcs. | BX-110n-DC6121-C01 Pcs. | BX-110n-DC6311-C01 Pcs. | BX-110n-DC6124-C01 Pcs |
|---|---|---|---|---|
| BOX-PC | 1 | 1 | 1 | 1 |
| The attachment fittings | 2 | 2 | 2 | 2 |
| CF card removal prevention fitting | 1 | 1 | 1 *1 | 1 |
| USB removal prevention fitting(base) | 1 | 1 | 1 | 1 |
| USB removal prevention fitting(angle) | 4 | 4 | 4 | 4 |
| Washer assembled screw(M3×6) | 4 | 4 | 4 | 4 |
| Washer assembled screw (M3×8, black) | 6 | 6 | 6 | 6 |
| Washer assembled Cross recessed hexagonal bolt(M4×10, black) | 4 | 4 | 4 | 4 |
| Power supply connector complete set | | | | |
| Power connector | 1 | 1 | 1 | 1 |
| Contact | 4 | 4 | 4 | 4 |
| Cable clamp | 2 | 2 | 2 | 2 |
| Product guide(this sheet) | 1 | 1 | 1 | 1 |
| IPC Precaution List | 1 | 1 | 1 | 1 |
| Royalty consent contract | None | 1 | 1 | 1 |
| Setup Procedure Document | None | 1 | 1 | 1 |
| Notes on using Windows Embedded Standard | None | None | 1 | None |
| Recovery Media | None | 1 | 1 | 1 |
| HDD/SDD exchange seal | 2 | 1 | 2 | 1 |
| HDD/SDD protection seal | 4 | 2 | 4 | 2 |

*1 It is attached to the main body.

*The latest user's manual is available from the CONTEC homepage.

Product Configuration Image




* See the Product Configuration List to check if all the components are included for the specified number of units.

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# 1. Introduction

# About the Product

This product is a fanless PC for embedded use based on a dual-core Atom processor D510 1.66GHz. It has small footprint of about A4-size and low height which allows installation in a space of 50mm thick*1. Dual-core CPU and DDR2 SDRAM 2GB memory contribute to high-performance computing with high-reliable design, such as fan-less, spindle-less and slit-less.
The speedy dual-core processor introduces the fastest computing in compact BOX-PC series. When applications should be processed parallel, they will be computed very efficiently by 2-cores and 4-threads processing.

Embedded-type CPU and chip set have been adopted. The use of readily available parts ensures the ease of the use of the product. In addition, the use of Contec-customized BIOS allows support to be provided at the BIOS level.
The model can incorporate up to two 2.5-inch SATA HDDs, which enhances RAS feature. Windows XP Professional installed model that adopts HDD supporting wider temperature range is most suitable as a unit embedded into bulk data server.

*1 installed vertically

This product is available in the following 4 models:

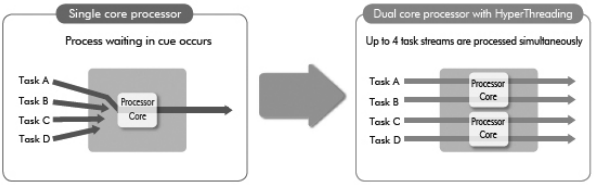
- Base model with Intel Atom Processor D510 1.66GHz
  BX-110n-DC6000-C01 (Memory 2GB, without OS, CF, HDD)
- XP Professional-installed model with Intel Atom Processor D510 1.66GHz
  BX-110n-DC6121-C01 (Memory 2GB, Windows XP Professional, HDD 100GB, without CF)
- WES2009-installed model with Intel Atom Processor D510 1.66GHz
  BX-110n-DC6311-C01 (Memory 2GB, Windows Embedded Standard 2009, CF 2GB, without HDD)
- 7 Professional-installed model with Intel Atom Processor D510 1.66GHz
  BX-110n-DC6124-C01 (Memory 2GB, Windows 7 Professional, HDD 100GB, without CF)

# Features

- Dual core energy saving processor with HyperThreading Technology

Dual-core CPU and DDR2 SDRAM 2GB memory make it possible to process heavy applications.

It supports HyperThreading (2-cores and 4-threads) and contributes to stable multi-processing, such as parallel communications, controlling and HMI.




- Able to contain HDD that can handle large amounts of data

It can incorporate up to two 2.5-inch SATA HDDs that make it most suitable as a unit embedded into bulk data server.

- Major types of peripherals are supported with rich interfaces including the two CF card slots

In addition to extended interfaces such as 1000BASE-T x 2, USB2.0 x 4, serial (RS-232C x 5, RS-485/422 x 1), it also includes RAS and three units of general-purpose I/O. Two slots available for CF cards.

- Serving the downsizing of equipment, a small footprint design for A4-sized or smaller installation area

The product adopts space-saving design for A4-sized or smaller installation area 182(W) x 270(D) x 35(H), permitting placement with opening of only 50mm[*1]. It largely serves downsizing of your equipment, fits any area with the aestheticness kept. It is also possible to attach to the VESA standard 75 x 75, 100 x 100mm using the optional fittings.

*1 installed vertically

- Adoption of dual-core CPU

It adopts a dual-core CPU Intel (R) Atom(TM) Processor D510 1.66GHz. It realizes high-performance computing in spite of its small size.

- Slitless/fanless design that reduces maintenance work

It employs slitless/fanless designing achieved by the elimination of radiating slit and CPU fan. It is free from dusts and foreign objects, and the use the parts that degrades over the years is avoided in most case, resulting in drastic alleviation of the maintenance burden.

- Remote power management function to reduce operation tasks

This product supports timed/automated system start-up (Resume By Alarm). For example, it enables unattended operation, such as starting to show information of an establishment in unison at opening time. Also, it supports system start-up externally via network (Wake On LAN) and modem (Power On by Ring). It encourages significant labor saving in operation.

- Falling-off prevention tools and fixing clamps provided to avoid trouble caused by disconnected cable

This product stays trouble-free, being equipped with USB removal prevention fitting and cable clamp for connectors with no locking mechanism, such as USB cable, and with hardware to properly mount and avoid falling out of CF card.



- Expandable with PCI boards and/or PCI Express boards

By connecting a PCI Express Cable-based expansion chassis using one cable at extra cost, it can be expanded with up to thirteen expansion board.

- A wide range of power supplies (10.8 - 31.2VDC) supported

As the product supports a wide range of power (10.8 - 31.2VDC), it can be used in a variety of power environments.

- Safety design required for embedded applications

Retention of CMOS data by EEPROM allows the system to start up even when the battery has run out. Additionally, Windows Embedded Standard installed model realizes totally spindleless design with CF card adopted for the storage. It can utilize EWF feature of OS[*2] that protects CF card from unnecessary write, i.e. relieves concern about the limitation of number of writes to CF card, and that prevents system from unintentional modification, as a result of consideration for reassurance in designing necessary for the purpose of embedding.

*1 installed vertically

*2 EWF (Enhanced Write Filter) is a function specific to Windows Embedded Standard that protects the disk from being actually written by redirecting the writing to RAM.

## Supported OS

- Windows XP Professional (BX-110n-DCxx21-C01)
- Windows Embedded Standard 2009 (BX-110n-DCxx11-C01)
- Windows 7 Professional (BX-110n-DCxx24-C01)

# Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

## Web Site

| | |
|---|---|
| Japanese | http://www.contec.co.jp/ |
| English | http://www.contec.com/ |
| Chinese | http://www.contec.com.cn/ |

Latest product information

CONTEC provides up-to-date information on products.
CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information

Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

# Limited One-Year Warranty

CONTEC products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original products. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

# How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

# Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

# Safety Precautions

Understand the following definitions and precautions to use the product safely.

## Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

| | |
|---|---|
| ⚠ DANGER | DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. |
| ⚠ WARNING | WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. |
| ⚠ CAUTION | CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage. |

## Caution on the BX-110n Series

Handling Precautions

⚠ WARNING

- Always check that the power supply is turned off before connecting or disconnecting power cables.
- Do not modify the product.
- Always turn off the power before inserting or removing circuit boards or cables.
- This product is not intended for use in aerospace, space, nuclear power, medical equipment, or other applications that require a very high level of reliability. Do not use the product in such applications.
- If using this product in applications where safety is critical such as in railways, automotive, or disaster prevention or security systems, please contact your retailer.
- Do not attempt to replace the battery as inappropriate battery replacement poses a risk of explosion.
- For battery replacement, contact your retailer as it must be performed as a process of repair.
- When disposing of a used battery, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

## ⚠ CAUTION

- Do not use or store this product in a location exposed to high or low temperature that exceeds range of specification or susceptible to rapid temperature changes.
  Example: - Exposure to direct sun
  - In the vicinity of a heat source
- Do not use this product in extremely humid or dusty locations. It is extremely dangerous to use this product with its interior penetrated by water or any other fluid or conductive dust. If this product must be used in such an environment, install it on a dust-proof control panel, for example.
- Avoid using or storing this product in locations subject to shock or vibration that exceeds range of specification.
- Do not use this product in the vicinity of devices that generate strong magnetic force or noise. Such products will cause this product to malfunction.
- Do not use or store this product in the presence of chemicals.
- To clean this product, wipe it gently with a soft cloth dampened with either water or mild detergent. Do not use chemicals or a volatile solvent, such as benzene or thinner, to prevent pealing or discoloration of the paint.
- This product's case may become hot. To avoid being burned, do not touch that section while this product is in operation or immediately after turning off the power. Avoid installation in a location where people may come into contact with that section.
- CONTEC does not provide any guarantee for the integrity of data on any recording media.
- Always disconnect the power cable from the receptacle before mounting or removing the expansion board, or before connecting or disconnecting any connector.
- To prevent corruption of files, always shutdown the OS before turning off this product.
- CONTEC reserves the right to refuse to service a product modified by the user.
- In the event of failure or abnormality (foul smells or excessive heat generation), unplug the power cord immediately and contact your retailer.
- To connect with peripherals, use a grounded, shielded cable.
- Before connecting/disconnecting CF or HDD, ensure that its power is turned off.
- The CF card connector doesn't support hot plug. The pulling out opening of the CF card cannot be done in the state of power supply ON. Please neither pulling out opening of CF in the state of power supply ON of this product nor come in contact with CF. This product may malfunction or cause a failure.
- Component Life:
  (1) Battery---The internal calendar clock and CMOS RAM are backed by a Lithium primary battery. The backup time at a temperature of 25°C with the power disconnected is 10 years or more.
  (2) CF---------WES2009-installed model (BX-110n-DCxx11-C01) uses a CF card in the OS storage area. Estimated failure rates: 100,000 rewrite cycles, 500,000 hours MTBF. For more details, refer to Section 6 "Life of CF".
  (3) HDD------XPpro-installed model (BX-110n-DCxx21-C01),
  W7pro-installed model (BX-110n-DCxx24-C01) uses HDD for the OS storage area. Service life of the drive is apporiximately 5 years or 30,000 power on hours, whichever comes first. MTBF is 300,000h. They are referential values under the following assumptions:
  - Seeking/Writing/Reading operation is less than 20% of power on hours
  * Replacement of expendables is handled as a repair (there will be a charge).
  * Component life is not guaranteed value but only referential value.

FCC PART 15 Class A Notice

**NOTE**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

**WARNING TO USER**

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.

# 2. System Reference

## Specification

**Table 2.1. Functional Specification < *1 / 3* >**

| Model | | BX-110n-DCxxxx-C01 |
|---|---|---|
| CPU | | Intel(R) Atom(TM) Processor D510 1.66GHz |
| Chip set | | Intel(R) ICH8M |
| BIOS | | BIOS (mfd. by Award) |
| Memory | | 2GB, 200pin SO-DIMM socket x 1, PC2-6400 (DDR2 800) DDR2 SDRAM support |
| Video | Controller | Built in Intel ICH8M |
| | Video RAM | Main memory shared |
| | Video BIOS | 64KB (C0000H-CFFFFH) |
| | Display I/F | Analog-RGB I/F x 1 (15 pin HD-SUB connector x 1) |
| | System resolution | 640 x 480, 800 x 600, 1,024 x 768, 1,152 x 864, 1,280 x 600, 1,280 x 720, 1,280 x 768, 1,280 x 960, 1,280 x 1,024, 1,400 x 1,050, 1,440 x 900, 1,600 x 900, 1,680 x 1,050, 1,920 x 1,080 (16,770,000 colors) |
| Audio | | HD Audio compliant<br>LINE OUT: ϕ3.5 Stereo mini jack<br>Full-scale output level 1.5Vrms (Typ.), Dual 50mW Amplifier<br>MIC IN : ϕ3.5 Stereo mini jack<br>Full-scale input level 1.3Vrms (Typ.) |
| Serial ATA I/F | | 2.5 inch SATA hard disk. slot-in system x 2, Corresponding to serial ATA 2.0 standard port. |
| | | BX-110n-DCxx21-C01, BX-110n-DCxx24-C01:<br>HDD1 is finished mounting SATA HDD.<br>(100GB, 1 partition) |
| CF card slot | | CF CARD Type I x 2 bootable |
| | | BX-110n-DCxx11-C01: CF1 is finished mounting CF (2GB, 1 partition) *1 |

*1: The capacity of CF is a value when 1GB is calculated by 1 billion bytes. The capacity that can be recognized from OS might be displayed fewer than an actual value.

**Table 2.1. Functional Specification** ***< 2 / 3 >***

| Model | | BX-110n-DCxxxx-C01 |
|---|---|---|
| Serial I/F | | RS-232C (general-purpose) : 5 channels<br>(SERIAL PORT A, B, C, D, E)<br>9pin D-SUB connector (male)<br>Baud rate : 50 - 115,200bps<br>RS-485/422 (general-purpose) : 1 channel<br>[Inside the RAS Connector] |
| LAN | I/F | 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector x 2 (Wake On LAN support) |
| | Controller | LAN-A: ICH8M built-in Controller<br>LAN-B: Intel 82574L Controller |
| USB I/F | | 4 channels (USB 2.0-compliant) |
| Keyboard/mouse I/F | | None *2 |
| General-purpose I/O | | Inside the 15-pin D-SUB connector (female) [RAS connector]<br>Optocoupler isolated I/O 3 channels for each<br>(However, when using, you need to switch between the output 1 channel and WDT external device, and between the input 1 channel and remote reset.) |
| RAS function | | Inside the 15-pin D-SUB connector (female) [RAS connector]<br>WDT: 1sec - 255sec (Reset, interrupt, and external output enabled by time up)<br>Remote reset : Input signal from external part. |
| PCI Express cable | | PCI Express 1.0a(x1) standard port<br>(18-pin PCI Express External Cabling connector x 1) |

*2: Use USB I/F for the keyboard / mouse.

**Table 2.1. Functional Specification** ***< 3 / 3 >***

| Model | | BX-110n-DCxxxx-C01 |
|---|---|---|
| Hardware monitoring | | Monitoring CPU temperature, board temperature, power voltage |
| Watch dog timer | | Software programmable, 255 level (1sec - 255 sec)<br>Causes a reset upon time-out. |
| RTC/CMOS | | Lithium backup battery life : 10 years or more<br>The real-time clock is accurate within ±3 minutes (at 25°C) per month<br>(ICH7 integrated RTC). |
| Power Management | | Power management setup via BIOS<br>Power On by Ring / Wake On LAN<br>Supports PC98/PC99 ACPI Power management |
| Power supply | Rated input voltage | 12 - 24VDC *3 |
| | Range of input voltage | 10.8 - 31.2VDC |
| | Power consumption | 12V 3.9A (Max.), 24V 2.1A (Max.) |
| | External device power supply capacity | - CF card slot +3.3V : 1A (500mA x 2)<br>- USB I/F +5V : 2A (500mA x 4) |
| Physical dimensions (mm) | | 182 (W) x 270 (D) x 35(H) (No protrusions) |
| Weight | | Without HDD : About 2.4kg<br>With one slot of HDD : About 2.5kg<br>With two slots of HDD : About 2.6kg |

*3: Use a power cable shorter than 3m.

**Table 2.2. Installation Environment Requirements**

| Model | | | BX-110n-DCxxxx-C01 | |
|---|---|---|---|---|
| Ambient specifications | Operating temperature *4 | | 0 - 45°C *6 | |
| | Storage temperature | | -10 - 60°C | |
| | Humidity | | 10 - 90%RH (No condensation) | |
| | Floating dust particles | | Not to be excessive | |
| | Corrosive gases | | None | |
| | Line-noise resistance | Line noise | AC line / ±2kV *5,<br>Signal line / ±1kV (IEC61000-4-4 Level 3,EN61000-4-4 Level 3) | |
| | | Static electricity resistance | Contact discharge / ±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2)<br>Atmospheric discharge / ±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3) | |
| | Vibration resistance | Sweep resistance | When HDD is on | 10 - 50Hz / 0.5G<br>25 min. each in x, y, and z directions<br>(JIS C60068-2-6-compliant,<br>IEC60068-2-6-compliant) |
| | | | When HDD is off | 10 - 57Hz / semi-amplitude 0.15 mm<br>57 - 150Hz/2.0G<br>40 min. each in x, y, and z directions<br>(JIS C60068-2-6-compliant,<br>IEC60068-2-6-compliant) |
| | Impact resistance | | 10G, half-sine shock for 11 ms in x, y, and z directions<br>(JIS C60068-2-27-compliant, IEC60068-2-27-compliant) | |
| | Grounding | | Class D grounding (previous class 3 grounding), SG-FG / continuity | |

*4: For more details on this, please refer to chapter 3, “Installation Requirements”.

*5: When AC/DC power unit “LDA100W-24-SN, LDA100W-12-SN” (by Cosel) is used.

*6: To use 1000BASE-T, you should keep its ambient temperature between 0 - 40°C.

# Power Management Features

- Support both ACPI (Advanced Configuration and Power Interface) and legacy (APM) power management.
- ACPI v2.0 compliant
- APM v1.2 compliant
- Support hardware automatic wake-up

# Power Requirements

Your system requires a clean, steady power source for reliable performance of the high frequency CPU on the product, the quality of the power supply is even more important. For the best performance makes sure your power supply provides a range of 10.8 V minimum to 31.2 V maximum DC power source.

## Power Consumption

For typical configurations, the CPU card is designed to operate with at least a 60W power supply. The power supply must meet the following requirements :

- Rise time for power supply: 2 ms - 30 ms

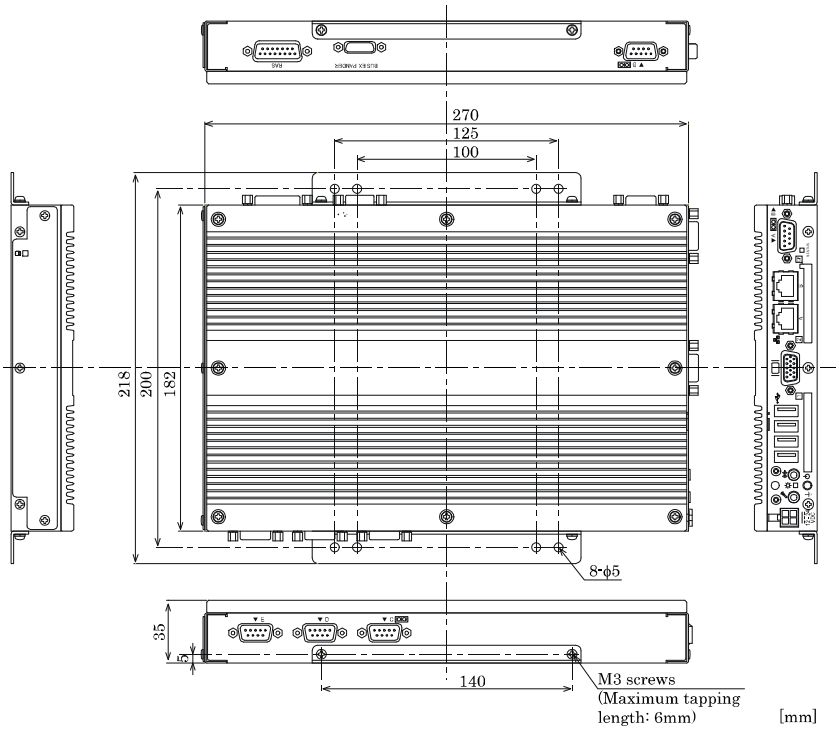
The following table lists the power supply's tolerances for DC voltages:

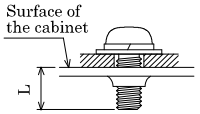
**Table 2.3. DC voltage tolerance**

| DC Voltage | Acceptable Tolerance |
|---|---|
| + 12V - 24V | + 10.8V - 31.2V |

# Physical Dimensions

BX-110n-DCxxxx-C01




*1: When you fasten the bundled attachment fittings to be fixed to the body, you should use the attached screws (M3 x 8). Otherwise, the length (L) from the surface of the cabinet to the screw tip should be 6mm or less.

*2: The length (L) from the surface of the cabinet to the screw tip should be 6mm or less.

**Figure 2.1. BX-110n-DCxxxx-C01**

# 3. Hardware Setup

## Before Using the Product for the First Time

Follow the next steps to set up this product:

STEP1 By referring to the information in this chapter, install, connect and set this product.

STEP2 Connect cables.
Connect the cable of necessary external devices, such as keyboard and a display, to this product using appropriate cables.

STEP3 Turn on the power.
After verifying that you have correctly followed steps 1 and 2, turn on the power.
If you find any abnormality after turning on the power, turn it off and check to see if the setup has been performed properly.

STEP4 Set up BIOS.
By referring to Chapter 5, set up BIOS. This setup requires a keyboard and a display.

* Before using this product, be sure to execute "LOAD SETUP DEFAULTS" to initialize the BIOS settings to their default values.
(See Chapter 5, "Main Menu.")

⚠ CAUTION

Be sure to connect the keyboard and mouse to it before turning the power on for the first time.

# Hardware Setup

- Before you start, be sure that the power is turned off.
- Remove only those screws that are explained. Do not move any other screw.

## Attaching the CF Attachment Fittings

(1) After inserting a CF Card, fasten the bundled CF attachment fittings with a screw.

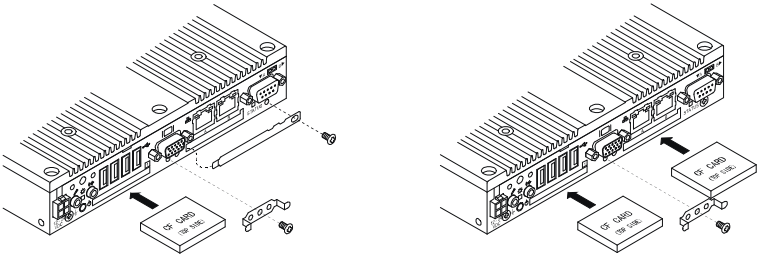


**Figure 3.1. Attaching the CF Attachment Fittings**

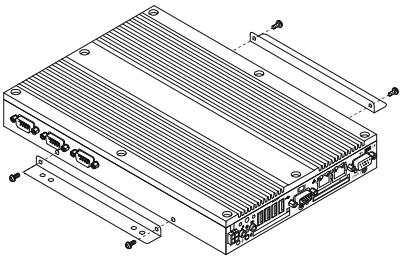
⚠ CAUTION

- Insert the CF Card face up.
- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque.The specified tightening torque is 3 - 3.5kgf·cm.

## Attaching the Attachment Fittings

(1) Use screws to attach the bundled attachment fittings with a screw.
Do not tighten screws with excess force.

BX-110n-DCxxxx-C01



* Attached screw (M3 x 8)

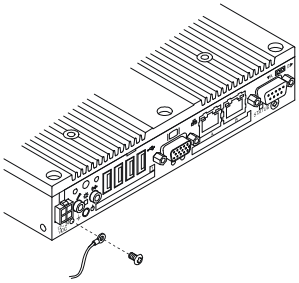
**Figure 3.2. Attaching the Attachment Fittings**

⚠ CAUTION

Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 5 - 6kgf·cm.

## Attaching the FG

(1) Use screws to attach the FG.



* Attached screw (M3 x 8)

**Figure 3.3. Attaching the FG**

⚠ CAUTION

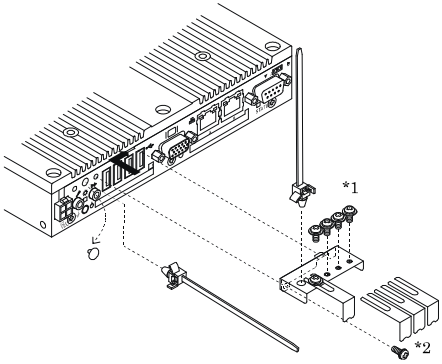
The FG pin of this product is connected to the GND signal of the DC power connector (DC-IN). Note that the connection cannot be cut off.

## Fastening the Cable

This product comes with clamps for fixing cables.

Fastening the LINEOUT, USB Cable

(1) The system unit has a hole for attaching cable clamp to USB removal prevention fitting. Using a cable clamp for a cable with lock-less connector, such as the LINEOUT and USB Cable, prevents the connector from being unplugged. Use the cable ties and cable clamps appropriately according to the connecting states and wiring directions of cables.




*1 Attached screw (M3 x 6)
*2 Attached screw (M3 x 8)

**Figure 3.4. Attaching the cable clamp**

(2) The photo below shows an example of using a cable clamp. Fix the cable with a clamp without applying stress to the connector.

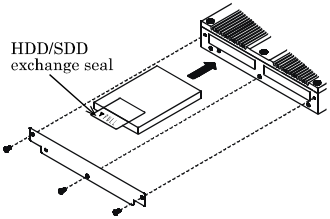


**Figure 3.5. Using example of cable clamp**

## Installing the Hard Disk

BX-110n-DCxxxx-C01 can incorporate 2.5-inch SATA hard disk on a slot-in basis.

< Installing >




< Removing >

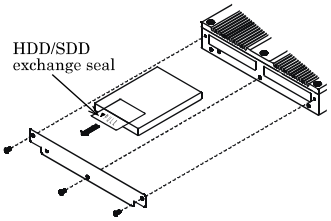



**Figure 3.6. Installing the Hard Disk**

## Using the Hard Disk other than the Standard Products

When you use HDD/SDD other than the standard products, please attach HDD/SDD protection seal and HDD/SDD exchange seal before you install HDD/SDD.

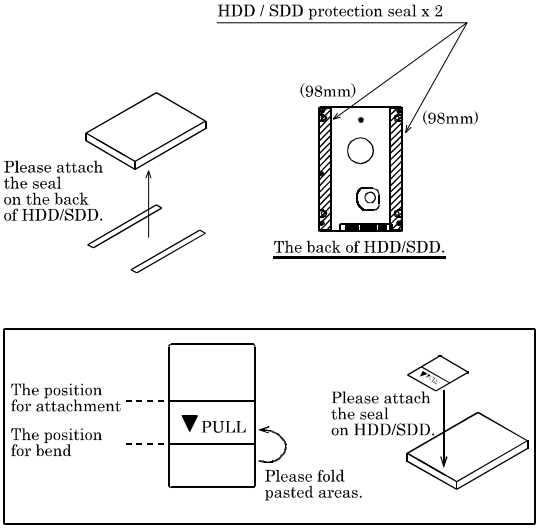



**Figure 3.7. Attachment of HDD/SDD Protection Seal and HDD/SDD Exchange Seal**

# Installation Requirements

Be sure that the ambient temperature is within the range specified in the installation environment requirement by making space between the product and device that generates heat or exhaust air.

BX-110n-DCxxxx-C01

Installable directions at operating temperature 0 - +45°C
: (1) Horizontal installation, (2), (3), (4), (5) Vertical installation

Installable directions at operating temperature 0 - +40°C
: All type of installation other than above (including diagonal installation)

When using 1000BASE-T

Installable directions at operating temperature 0 - +40°C
: All type of installation (including diagonal installation)

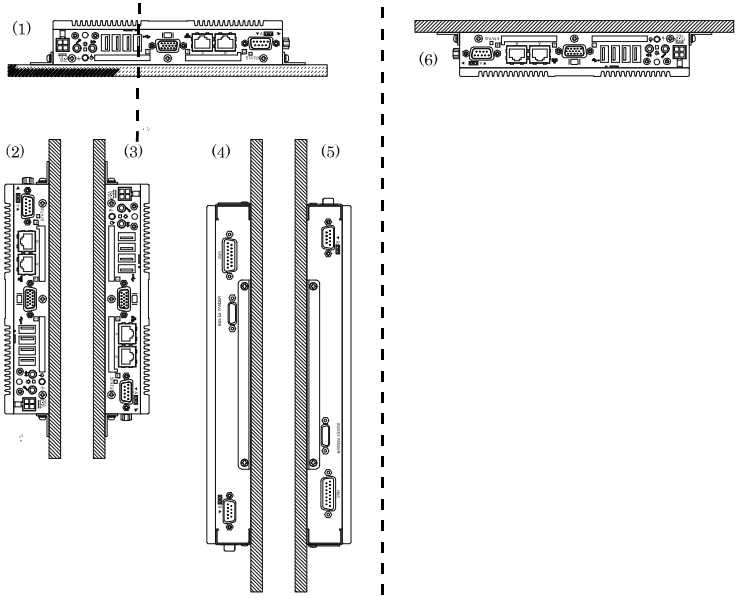



**Figure 3.8. Installation Orientation < BX-110n-DCxxxx-C01 >**

⚠ CAUTION

Note that even though the ambient temperature is within the specified range, an operational malfunction may occur if there is other device generating high heat; the radiation will influence the product to increase its temperature.

Distances between this product and its vicinity

- **BX-110n-DCxxxx-C01**

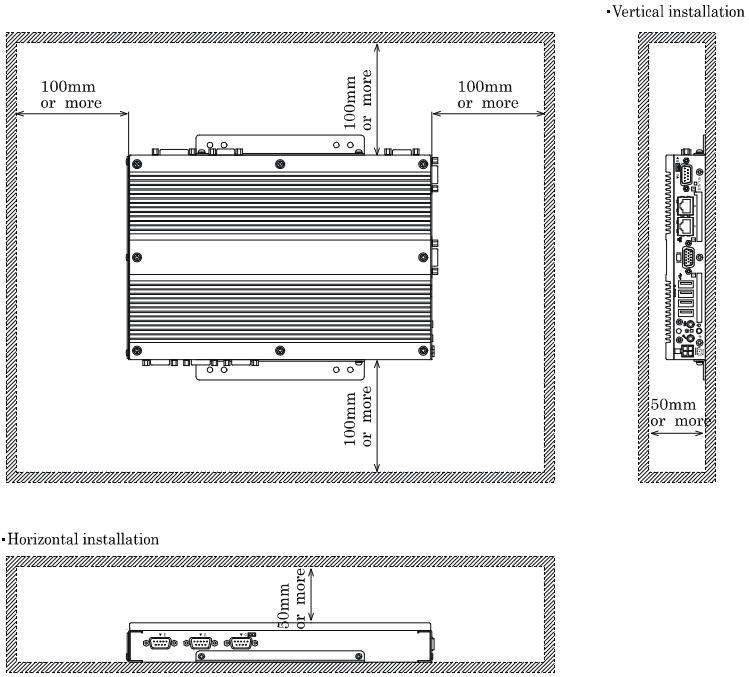



**Figure 3.9. Distances between this product and its vicinity < BX-110n-DCxxxx-C01 >**

## ⚠ CAUTION

Do not install this product into the fully-sealed space except the case in which the internal temperature is adjustable by equipment such as air conditioner. Troubles such as operational malfunctions could be occurred by the temperature increase caused by long-term usage.

Ambient temperature

In this product, the ambient temperature is decided from the multiple measurement points as shown below. When making use of the product, the air current should be adjusted to prevent that all the temperatures measured at the measurement points exceed the specified temperature.

- **BX-110n-DCxxxx-C01**

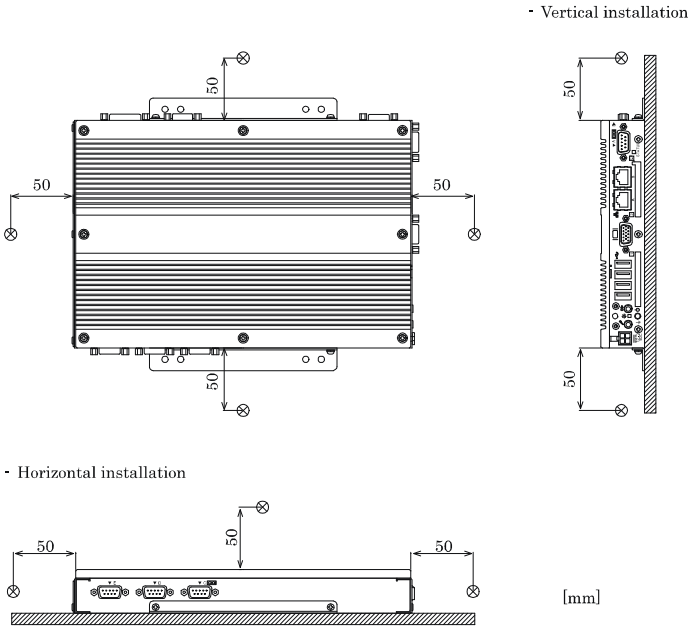



**Figure 3.10. Ambient temperature < BX-110n-DCxxxx-C01 >**

# 4. Each Component Function

## Component Name

### Front View

BX-110n-DCxxxx-C01

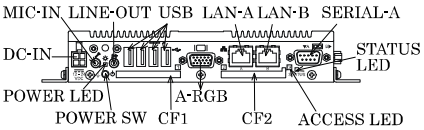
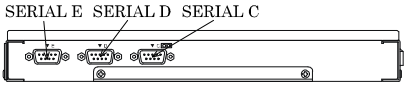



**Figure 4.1. Component Name < *1 / 3* >**

### Side View

BX-110n-DCxxxx-C01

Left side




Right side

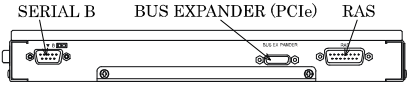



**Figure 4.1. Component Name < *2 / 3* >**

### Back View

BX-110n-DCxxxx-C01

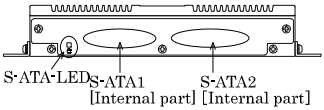



**Figure 4.1. Component Name < *3 / 3* >**

**Table 4.1. Component Function**

| Name | Function |
|---|---|
| POWER-SW | Power switch |
| POWER LED | Power ON display LED |
| ACCESS LED | IDE disk access display LED |
| STATUS LED | Status LED |
| S-ATA LED | S-ATA disk access display LED |
| DC-IN | DC power input connector |
| LINE OUT | Line out (ϕ3.5 PHONE JACK) |
| MIC IN | Mic. in (ϕ3.5 PHONE JACK) |
| LAN A | Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector |
| LAN B | Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector |
| USB | USB port connector x 4 |
| SERIAL A | Serial port 1 connector (9pin D-SUB/male) |
| SERIAL B | Serial port 2 connector (9pin D-SUB/male) |
| SERIAL C | Serial port 3 connector (9pin D-SUB/male) |
| SERIAL D | Serial port 4 connector (9pin D-SUB/male) |
| SERIAL E | Serial port 5 connector (9pin D-SUB/male) |
| A-RGB | Display (15pin D-SUB/female) |
| CF1 | CF card slot (IDE connection mastering) |
| CF2 | CF card slot (IDE connection slaving) |
| S-ATA1 | HDD slot (Serial-ATA) |
| S-ATA2 | HDD slot (Serial-ATA) |
| RAS | RAS function or RS-485 connector (15pin D-SUB/female) |
| BUS EXPANDER (PCIe) | PCI Express Cable connector (18pin PCI Express External Cabling/female) |

# System Configuration

BX-110n-DCxxxx-C01

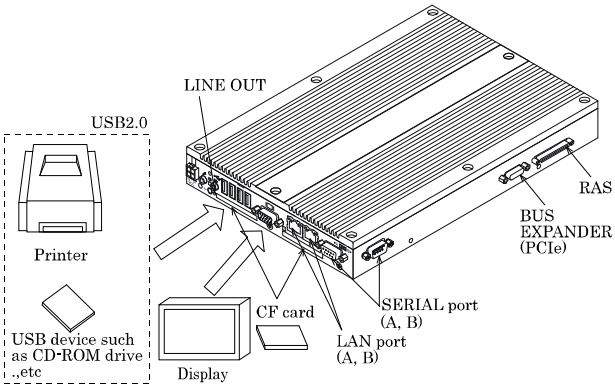



**Figure 4.2. System Configuration < BX-110n-DCxxxx-C01 >**

# Component Function

## LED: POWER, ACCESS, STATUS

There are 3 LED in front of this product.

**Table 4.2. Display Contents of LED**

| LED name | State | Display contents |
|---|---|---|
| POWER LED | OFF | Indicates that this product is switched off. |
| | ON (Green) | Indicates that this product is switched on. |
| ACCESS LED | ON (Orange) | Indicates that the IDE device is being accessed. |
| STATUS LED | OFF | You can control the behavior of LED from the user application. *1 |
| | Flashing, ON (Red) | You can control the behavior of LED from the user application. *1 |
| S-ATA LED | ON (Orange) | Indicates that the S-ATA device is being accessed. |

*1 API that controls STATUS LED is available. See the API description file "mtdll_e.chm" included in /RasUtility/Samples in the CONTEC's Web site [IPC-SLIB-01] for details.

## DC Power Input Connector : DC-IN

To supply the power, always use the power supply listed below.

Rated input voltage : 12 - 24VDC
Range of input voltage : 10.8 - 31.2VDC
Power capacity : 12V 3.9A or more, 24V 2.1A or more

**Table 4.3. DC Power Connector**

| Connector type | 9360-04P (mfd. by ALEX) | | | |
|---|---|---|---|---|
| | Pin No. | Signal name | Pin No. | Signal name |
| 4 3 / 2 1 | 4 | 12 - 24V | 3 | 12 - 24V |
| | 2 | GND | 1 | GND |

Applicable connector on the connector side

Housing : 9357-04 (mfd. by ALEX) or 5557-04R (mfd. by MOLEX)
Contact : 4256T2-LF (AWG18-24) (mfd. by ALEX) or 5556 (AWG18-24) (mfd. by MOLEX)

Rise time of power supply

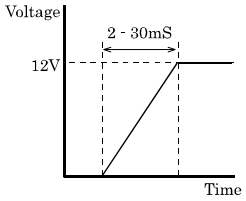



**Figure 4.3. Graph of Rise Time of Power Supply**

## POWER SW

POWER SW is provided.

## Line out Interface: LINE OUT

A line output connector is provided. You can plug a headphone or amplifier-integrated speakers into this connector.

## MIC in Interface: MIC

A MIC input connector is provided. You can plug a microphone to this connector for sound input.

Audio driver

The audio driver is required to use the microphone input and line output interfaces.

Install the appropriate audio driver for your OS from the CONTEC's Web site CD-ROM [IPC-SLIB-01]. (For information on the latest version of IPC-SLIB-01, check the CONTEC's Web site.)

## Serial-ATA: S-ATA1 - 2

This product is equipped with the serial-ATA 2.0-compliant controller, allowing a 2.5-inch SATA hard disk drive to the on-board connector.

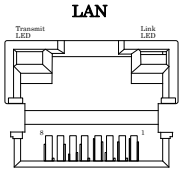
# Giga bit-Ethernet: LAN A – B

This product is equipped with 2 ports for giga bit.

- Network type : 1000BASE-T/100BASE-TX/10BASE-T
- Transmission speed * : 1000M/100M/10M bps
- Max. network path length : 100m/segment
- Controller : ICH8M built-in (LAN-A), Intel 82574L (LAN-B)

* Operation at 1000Mbps requires a category 5e cable.

**Table 4.4. Giga bit-Ethernet Connector**




| Pin No. | Function | |
|---|---|---|
| | 100BASE-TX | 1000BASE-T |
| 1 | TX+ | TRD+(0) |
| 2 | TX- | TRD-(0) |
| 3 | RX+ | TRD+(1) |
| 4 | N.C. | TRD+(2) |
| 5 | N.C. | TRD-(2) |
| 6 | RX- | TRD-(1) |
| 7 | N.C. | TRD+(3) |
| 8 | N.C. | TRD-(3) |

LEDs for display of network statuses:

Right LED : Link LED
Normal connection : Green ON, Operation: Green Blinking
Left LED : Operation LED
10M: Off, 100M : Green, 1000M: Orange

LAN drivers

Install the appropriate audio driver for your OS from the CONTEC's Web site [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

⚠ CAUTION

Attention should to be paid to the guaranteed operating range of temperature in using 1000BASE-T. For more details on this, refer to chapter3, Installation Requirements. Note that the Ethernet should be configured as 100BASE-TX or 10BASE-T in using under the temperature 0 - 45°C.

# USB Ports

This product is equipped with 4 channels for USB 2.0 interface.

**Table 4.5. USB Connector**



| Pin No. | Function |
|---|---|
| 1 | USB_VCC |
| 2 | USB- |
| 3 | USB+ |
| 4 | USB_GND |

# Serial Port Interface: SERIAL A - E

SERIAL A, B, C, D, E (RS-232C Ports)

The product has 5 channels of RS-232C compliant serial ports supporting up to a baud rate of 115,200bps with a 16-byte transmission-dedicated data buffer and a 16-byte reception-dedicated data buffer. You can use “Chapter 5 BIOS Setup” to configure an I/O address, interrupt and unused state for each of the ports independently. (The same I/O address and IRQ cannot be shared with any other device.)
Please refer to “Chapter 7 I/O Port Addresses” for more information on I/O address and register function.

**Table 4.6. SERIAL A, B, C, D, E I/O Addresses and Interrupts**

| SERIAL | I/O address | Interrupt |
|---|---|---|
| A | 3F8h - 3FFh | IRQ 4 |
| B | 2F8h - 2FFh | IRQ 3 |
| C | 2A8h - 2AFh | IRQ 6 |
| D | 2B0h - 2B7h | IRQ 7 |
| E | 2C0h - 2C7h | IRQ 10 |
| RS-422/485 Port | 2C8h - 2CFh | IRQ 11 |
| T.P Port (system reserved) *1 | 2A0h - 2A7h | IRQ 5 |

*1 Set as Disable when shipped. Not available since it is for the reserved device for the functional expansion in future. The I/O address is fixed and can not be changed.

**Table 4.7. Serial Port Connector**

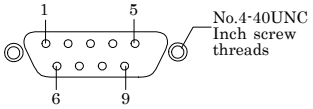
| Connector used on the product | 9-pin D-SUB (MALE) | | |
|---|---|---|---|
|  | | | |
| Pin No. | Signal name | Meaning | Direction |
| 1 | CD | Carrier detect | Input |
| 2 | RD | Received data | Input |
| 3 | TD | Transmitted data | Output |
| 4 | DTR | Data terminal ready | Output |
| 5 | GND | Signal ground | ----- |
| 6 | DSR | Data set ready | Input |
| 7 | RTS | Request to send | Output |
| 8 | CTS | Clear to send | Input |
| 9 | RI | Ring indicator | Input |

**Table 4.8. RS-422/485 Port Connector (Inside the RAS Connector)**

| Pin No. | Signal name | Meaning |
|---|---|---|
| 2 | TX + | Transmitted data + |
| 10 | TX - | Transmitted data - |
| 3 | RX + | Received data + |
| 11 | RX - | Received data - |

Reference

For more information on the RAS connector see Table 4.12, "RAS connector".

RS-422/RS-485 Specifications

- Transmission method : RS-422/RS-485-compliant, asynchronous, serial transmission, half duplex/full duplex
- Baud rate : 50 - 115,200bps (programmable)
- Signal extension distance : 1.2km Max.

Terminal Resister when RS-485 is in Use

It is set in BIOS setup menu. At the time of shipment, the setting is “no terminating resistance”.

For more details on this, please refer to Chapter 5, “Onboard Device”.

Control of Transmitted Data in Half-Duplex Mode

In half-duplex mode, the transmission buffer needs to be controlled in order to prevent collision of transmitted data. The BOX-PC uses RTS and controls the buffer with modem control register's bit 1. Transmission and reception gate control by the register setting of port address 4007h is allowed only for the RS-422/485 (Serial port D). For more information see section, "General-purpose I/O and Remote Reset" in Chapter 4.

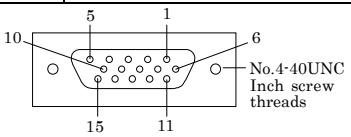
**Modem control register**

(Set I/O address +4H) bit 1 : 0 … RTS is High. (Disable transmission)
1 … RTS is Low. (Enable transmission)

# Display Interface: A-RGB

Connector for display connection is provided. Connector name is A-RGB (HD-SUB 15P).

**Table 4.9. Display Connector**

| Connector type | HD-SUB 15 pin (FEMALE) | | |
|---|---|---|---|
|  | | | |
| Pin No. | Signal name | Pin No. | Signal name |
| 1 | RED | 9 | +5V |
| 2 | GREEN | 10 | GND |
| 3 | BLUE | 11 | N.C. |
| 4 | N.C. | 12 | DDCDATA |
| 5 | GND | 13 | HSYNC |
| 6 | GND | 14 | VSYNC |
| 7 | GND | 15 | DDCCLK |
| 8 | GND | | |

For the LCDs that can be connected, please refer to “Chapter 7 List of Options”.

Display driver

Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

## ⚠ CAUTION

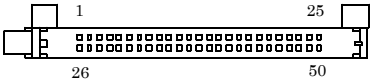
When the analog display is used, Windows MS-DOS may not be properly displayed in full-screen mode.
This is because the frequency and resolution of Windows and MS-DOS (full-screen display) are the same due to the screen settings while the display parameters are different.
For display, as only one parameter can be stored for one frequency or resolution, only either of Windows or MS-DOS screen can be displayed properly.
In this case, change the resolution or display frequency of Windows so that it is not the same as for the MS-DOS display.

# CF Card Connector (Primary IDE Connection): CF1 - 2

The CF Card (Type I: dedicated to the memory card) can be connected.
The CF card connector doesn't support hot plug. The pulling out opening of the CF card cannot be done in the state of power supply ON. Please neither pulling out opening of CF in the state of power supply ON of this product nor come in contact with CF. This product may malfunction or cause a failure. Before you insert/remove the CF card, make sure that the power is switched off and the access LED is turned off.

**Table 4.10. CF Card Connector**

| Connector used on the product | 50-socket header type (1.27mm pitch) |
|---|---|



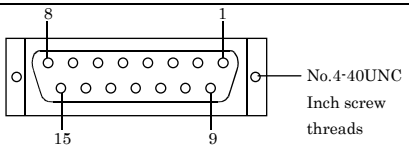

| Pin No. | Signal name | Direction | Pin No. | Signal name | Direction |
|---|---|---|---|---|---|
| 1 | GND | | 26 | GND | |
| 2 | DD3 | I/O | 27 | DD11 | I/O |
| 3 | DD4 | I/O | 28 | DD12 | I/O |
| 4 | DD5 | I/O | 29 | DD13 | I/O |
| 5 | DD6 | I/O | 30 | DD14 | I/O |
| 6 | DD7 | I/O | 31 | DD15 | I/O |
| 7 | CS0- | Output | 32 | CD3- | Output |
| 8 | GND | | 33 | GND | |
| 9 | GND | | 34 | DIOR- | Output |
| 10 | GND | | 35 | DIOW- | Output |
| 11 | GND | | 36 | +3.3V | |
| 12 | GND | | 37 | INTRQ | Input |
| 13 | +3.3V | | 38 | +3.3V | |
| 14 | GND | | 39 | CSEL- | Output |
| 15 | GND | | 40 | N.C | |
| 16 | GND | | 41 | RESET- | Output |
| 17 | GND | | 42 | IOCHRDY | Input |
| 18 | DA2 | Output | 43 | DDRQ | Input |
| 19 | DA1 | Output | 44 | DDACK- | Output |
| 20 | DA0 | Output | 45 | DACT- | Output |
| 21 | DD0 | I/O | 46 | PDIAG- | Output |
| 22 | DD1 | I/O | 47 | DD8 | I/O |
| 23 | DD2 | I/O | 48 | DD9 | I/O |
| 24 | N.C | | 49 | DD10 | I/O |
| 25 | GND | | 50 | GND | |

# RAS Functions: RAS

This port offers watchdog timer, remote reset, and general-purpose I/O RAS functions.

**Table 4.11. RAS Connector**

| Connector type | 15pin D-SUB (FEMALE) |
|---|---|




| Pin No. | Signal name | Function |
|---|---|---|
| 1 | N.C. | None |
| 2 | TX+ | RS-485 transmitting line |
| 3 | RX+ | RS-485 receiving line |
| 4 | NCOM | Minus common dedicated to PO2 |
| 5 | PO0 | General-purpose output |
| 6 | NCOM | General-purpose output minus common |
| 7 | PI1 | General-purpose input |
| 8 | PCOM | General-purpose input plus common |
| 9 | GND | External speaker ground |
| 10 | TX- | RS-485 transmitting line |
| 11 | RX- | RS-485 receiving line |
| 12 | PO2/WDT | General-purpose output or watch dog timer alarm output |
| 13 | PO1 | General-purpose output |
| 14 | PI2/IRQ | General-purpose input or interrupt input |
| 15 | PI0 | General-purpose input |

⚠ CAUTION

Pin 4 NCOM (minus common dedicated to PO2) and pin 6 NCOM (minus common shared by PO0 and PO1) are electrically separated from each other.

# Watchdog Timer

The watchdog timer is started by output of A5 to I/O port address 4002h. A second output of A5 to the same port within the specified expiration time once again triggers the watchdog timer. If a time-out occurs, a reset or an interrupt is generated according to the 4004h port setting or an alarm is output according to the 4004h port setting.

The time-out period can be set between 1 - 255 seconds depending on the timer value setting for the WDT counter port (4003h).

The watchdog timer stops by reading port 4002h. The alarm-out output is cancelled at the same time.

The alarm out is output from the RAS connector's PO2/WDT (pin 12) and cancelled when reset.

The alarm-out output can be set to BIOS startup by BIOS setup (see Chapter 5), watchdog timer startup, or watchdog timer time-up.

Specifications

- Time to be set: 1sec - 255sec
- Interrupt or reset: Resets or generates an interrupt at time-up (Port setting).
- External alarm output: Optocoupler isolated open-collector output (the output status is set by software). For more information, see the general-purpose I/O specifications.
- I/O addresses: 4000h - 4007h (RAS port)

How to Use the Watchdog Timer

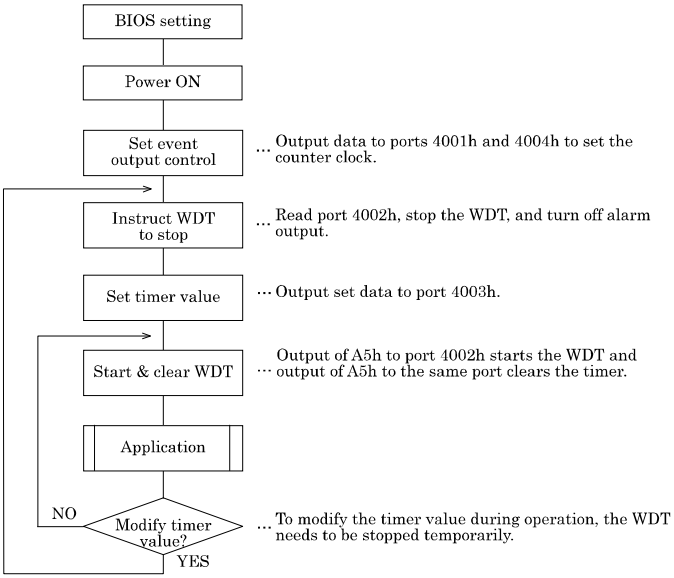



**Figure 4.5. How to Use the Watchdog Timer**

**Example usage** **:** To assign IRQ5 to the event whose time-up value is 15sec:

Out 4004h 01h : Set the event at the time of WDT expiration to IRQ5.

In 4002h : Stop the WDT timer and cancel the alarm.

Out 4003h 0Fh : Set the WDT expiration time to 15sec.

Out 4002h A5h : Start and clear the WDT.

In 4002h : Stop the WDT and cancel the alarm.

*** 4001h (bit4-6): Alarm out output control**

| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | |
|---|---|---|---|---|---|---|---|---|
| --- | WD_S1 | WD_S0 | PO2_M | RESET | PIM2 | PIM1 | PIM0 | R/W (Default: XXXX0000b) |

**Figure 4.6. Alarm Out Output Control Port (4001h)**

PO2_M : PO PO2/WDT pin output setting
0 : Set the RAS connector's PO2/WDT(12) signal to PO2 (general-purpose output).
1 : Set the RAS connector's PO2/WDT(12) signal to alarm out.

**Table 4.12. WD_S1, WD_S0: Alarm-out Output Status Settings**

| WD_S1 | WD_S0 | External alarm output status | | | |
|---|---|---|---|---|---|
| | | When power is turned off | When BIOS starts | When WDT starts | When time expires on WDT |
| 0 | 0 | OFF | OFF | OFF | ON |
| 1 | 0 | OFF | OFF | ON | OFF |
| 1 | 1 | OFF | ON | ON | OFF |
| 0 | 1 | OFF | ON | OFF | ON |

*** 4002h: WDT control**

| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | |
|---|---|---|---|---|---|---|---|---|
| — | — | — | — | — | — | — | — | R/W |

**Figure 4.6. WDT Control Port (4002h)**

R : Cancels WDT stop/alarm.
Read data is undefined.

W : Start and clear the WDT
Write A5h to start and clear the WDT.

*** 4003h: WDT counter**

| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | |
|---|---|---|---|---|---|---|---|---|
| T7 | T6 | T5 | T4 | T3 | T2 | T1 | T0 | W |

**Figure 4.8. WDT Counter Port (4003h)**

W : Writes watchdog timer count data.
Write watchdog timer counter expiration time data.

1sec → 01h
8sec → 08h
15sec → 0Fh
30sec → 1Eh

*** 4004h: Event output control**

| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | |
|---|---|---|---|---|---|---|---|---|
| --- | --- | --- | --- | RESET | WM2 | WM1 | WM0 | R/W (Default: XXXX0000b) |

**Figure 4.9. Event Output Control Port (4004h)**

**Table 4.13. WM2-WM0: Interrupt Output Modes**

| WM2 | WM1 | WM0 | Interrupt output at occurrence of WDT errors |
|---|---|---|---|
| 0 | 0 | 1 | Output to IRQ5 when time expires on the WDT. |
| 0 | 1 | 0 | Output to IRQ7 when time expires on the WDT. |
| 0 | 1 | 1 | Reserved<br>* Do not set this value. |
| 1 | 0 | 0 | Output to IRQ10 when time expires on the WDT. |
| 1 | 0 | 1 | Output to IRQ11 when time expires on the WDT. |
| 1 | 1 | 0 | Output to NMI when time expires on the WDT. |
| Others | | | Inhibits output when time expires on the WDT. |

**Table 4.14. RESET: Reset Output Modes**

| RESET | RESET output at occurrence of WDT errors |
|---|---|
| 0 | Inhibits RESET output when time expires on the WDT. |
| 1 | Allows RESET output when time expires on the WDT. |

Note! : When time expires on WDT, the alarm-out is output irrelevant to the settings of the port for controlling event output.

*** 4005h : RAS status port**

| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | |
|---|---|---|---|---|---|---|---|---|
| — | — | — | — | — | — | — | WDT | R (Default: XXXXXXX0b) |

**Figure 4.10. RAS Status Port (4005h)**

R : RAS status port

WDT : WDT status

This is the WDT status bit. This bit is cleared when the WDT stops (read port 4002h).

0 : The WDT is either stopped or counting.

1 : The time set on the WDT expired.

# General-purpose I/O and Remote Reset

The BOX-PC is equipped with three general-purpose insulated signals each for input and output. The input signals can also be used for interrupt input or remote reset input.

Specifications

[ Input ]

- Input specifications : Current-driven input by Optocoupler isolation
- Input resistance : 4.7kΩ
- Input signal count : 3 [One of them can be used for remote reset and interrupt input (bit2<fixed>)]
- Input protection circuit : Equipped with a reverse-connection protection diode
- Input response time : Less than 100μsec
- External circuit power supply: 12 - 24VDC (±10%)

[ Output ]

- Output specifications : Open-collector output by Optocoupler isolation
- Output rating : Max. 30VDC, 100mA
- Output signal count : 3 [One of them can be used for WDT alarm output. (bit2<fixed>)]
- Output response time : Less than 300μsec

[ Common ]

- I/O addresses 4000h and 4001h

How to Use General-purpose I/O and Remote Reset

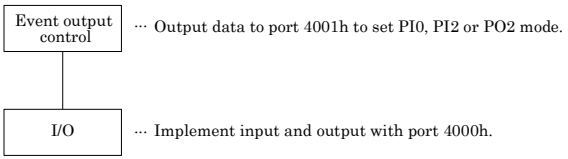



**Figure 4.10. How to Use General-purpose I/O and Remote Reset**

I/O Addresses and Instructions

*** 4000h: General-purpose I/O**

| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | |
|---|---|---|---|---|---|---|---|---|
| — | — | — | — | — | PIO2 | PIO1 | PIO0 | R/W |

**Figure 4.11. General-purpose Input Port (4000h)**

R : Read data from PI0, PI1 and PI2.

W : Set data to be output to PO0, PO1 and PO2.

*** 4001h (bit0-3): PI2/IRQ(14) event input control**

| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|
| — | WD_S1 | WD_S0 | PO2_M | RESET | PIM2 | PIM1 | PIM0 |

**Figure 4.12. Event Input Control Port (4001h)**

**Table 4.15. PIM2 - PIM0 : Interrupt output mode**

| RIM2 | RIM1 | RIM0 | PI2/IRQ (14) interrupt input |
|---|---|---|---|
| 0 | 0 | 1 | Input the RAS connector's PI2/IRQ (14) signal to IRQ5. |
| 0 | 1 | 0 | Input the RAS connector's PI2/IRQ (14) signal to IRQ7. |
| 0 | 1 | 1 | Reserved * Do not set this value. |
| 1 | 0 | 0 | Input the RAS connector's PI2/IRQ (14) signal to IRQ10. |
| 1 | 0 | 1 | Input the RAS connector's PI2/IRQ (14) signal to IRQ11. |
| 1 | 1 | 0 | Input the RAS connector's PI2/IRQ (14) signal to NMI. |
| Others | | | Inhibit the RAS connector's PI2/IRQ (14) signal interrupt to be set. |

**Table 4.16. RESET: Reset Input Modes**

| RESET | PI2/IRQ (14)'s RESET input |
|---|---|
| 0 | Inhibit the remote reset input function of the RAS connector's PI2/IRQ (14) signal. |
| 1 | Use as the remote reset input function of the RAS connector's PI2/IRQ (14) signal. |

⚠ CAUTION

A bit indicated with "rsv" is used by the system. Do not modify the bit.

*** 4007h: Control of RS-485 transmission and reception**

| D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 | |
|---|---|---|---|---|---|---|---|---|
| — | — | — | — | RE_GATE | TE_GATE | TE_SEL | rsv* | R/W (Default: XXXX0000b) |

**Figure 4.13. RS-485 Transmission and Reception Control Port (4007h)**

TE_SEL : Select the RS-485 transmission enable signal.

0 : Sets the RTS signal to the RS-485 transmission enable signal. (factory setting)

1 : Sets the TE_GATE value to the RS-485 transmission enable signal.

TE_GATE : RS-485 transmission enable signal. Valid only when the TE_SEL value is "1."

0 : RS-485 transmission Enable (factory setting)

1 : RS-485 transmission Disable

RE_GATE : RS-485 transmission enable signal.

0 : RS-485 reception Enable (factory setting)

1 : RS-485 reception Disable

⚠ CAUTION

A bit indicated with "rsv" is used by the system. Do not modify the bit.

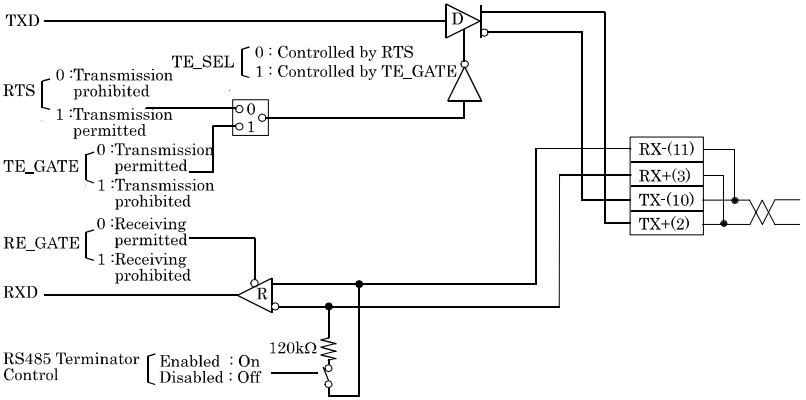



**Figure 4.14. Half-Duplex Connection Method**

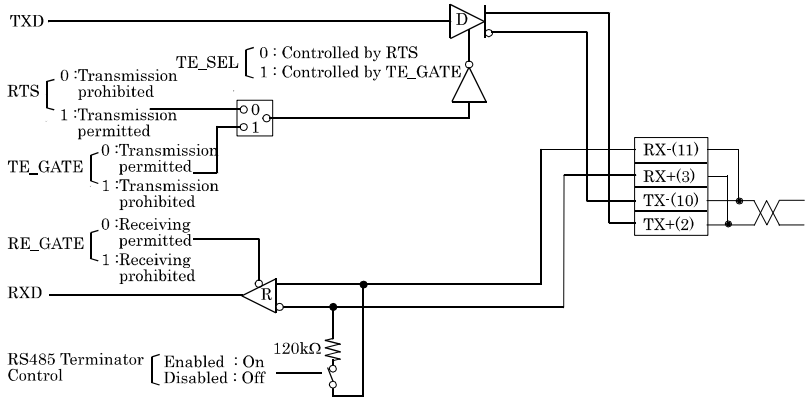



**Figure 4.15. Full-Duplex Connection Method**

External I/O Circuit

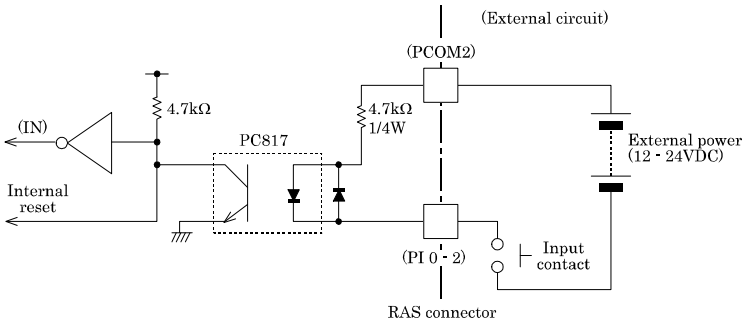



**Figure 4.16. Input Circuit**

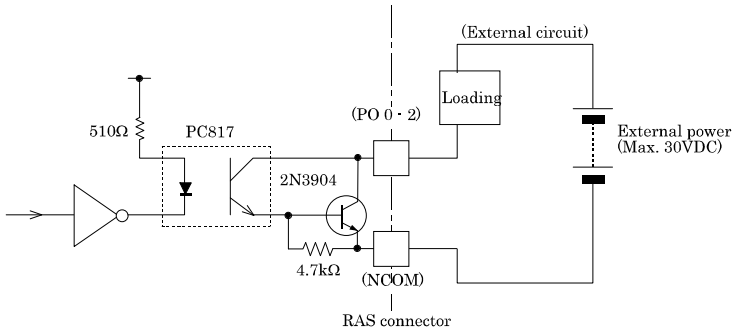
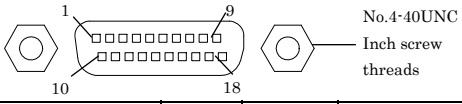



**Figure 4.17. Output Circuit**

# BUS EXPANDER (PCIe)

This product is equipped with the PCI Express cable port.
You can use CONTEC's abundant measurement control boards by connecting with our PCI Express Cable-based expansion chassis and CB-CE-1 or CB-CE-3, the cable for Cable Express at extra cost.

**Table 4.18. PCI Express cable Connector**

| Connector type | 18pin (FEMALE) | | | | |
|---|---|---|---|---|---|
|  | | | | | |
| Pin No. | Signal name | Function | Pin No. | Signal name | Function |
| 1 | Tx+ | PCI Express transmitting line | 10 | GND | GND |
| 2 | Tx- | | 11 | CPERST# | Reset signal |
| 3 | Reserved | None | 12 | N.C. | None |
| 4 | N.C. | None | 13 | CLK+ | PCI Express clock |
| 5 | GND | GND | 14 | CLK- | |
| 6 | Reserved | None | 15 | N.C. | None |
| 7 | Reserved | None | 16 | N.C. | None |
| 8 | N.C. | None | 17 | RX+ | PCI Express receiving line |
| 9 | GND | GND | 18 | RX- | |

## ⚠ CAUTION

- PCI Express cable is 32-bit spec. We have not verified operation on boards for both 64bit and 32bit, such as ADAPTEC's 39160SCSI board and Intel's Pro1000/MT network board.
- PCI Express bus is x1 spec. Buses requiring baud rate more than x1 (x16, etc.) cannot be used.
- Leave "Reserved" pins unconnected. Connecting these pins may cause a fault in this product.

# 5. BIOS Setup

## Introduction

This chapter discusses Award's Setup program built into the FLASH ROM BIOS. The Setup program allows users to modify the basic system configuration. This special information is then stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

The rest of this chapter is intended to guide you through the process of configuring your system using Setup.

## Starting Setup

The Award BIOS is immediately activated when you first power on the computer. The BIOS reads the system information contained in the CMOS and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1 By pressing <Del> immediately after switching the system on, or

2 By pressing the <Del> key when the following message appears briefly at the bottom of the screen during the POST (Power On Self-Test).

**Press DEL to enter SETUP.**

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to.

**Press F1 to continue, DEL to enter SETUP**

# Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

**Table 5.1. Using Setup**

| Key | Function |
|---|---|
| **Up Arrow** | Move to the previous item |
| **Down Arrow** | Move to the next item |
| **Left Arrow** | Move to the item on the left (menu bar) |
| **Right Arrow** | Move to the item on the right (menu bar) |
| **Esc** | Main Menu: Quit without saving changes<br>Submenus: Exit Current page to the next higher level menu |
| **Move Enter** | Move to the item you desired |
| **PgUp key** | Increase the numeric value or make changes |
| **PgDn key** | Decrease the numeric value or make changes |
| **+ key** | Increase the numeric value or make changes |
| **- key** | Decrease the numeric value or make changes |
| **Esc key** | Main Menu -- Quit and not save changes into CMOS<br>Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu |
| **F1 key** | General help on Setup navigation keys |
| **F5 key** | Load previous values from CMOS |
| **F6 key** | Load the fail-safe defaults from BIOS default table |
| **F7 key** | Load the optimized defaults |
| **F10 key** | Save all the CMOS changes and exit |

## Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the F1 key again.

## In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the AwardBIOS™ supports an override to the CMOS settings which resets your system to its defaults.

The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

## A Final Note About Setup

The information in this chapter is subject to change without notice.

# Main Menu

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

Note that a brief description of each highlighted selection appears at the bottom of the screen.

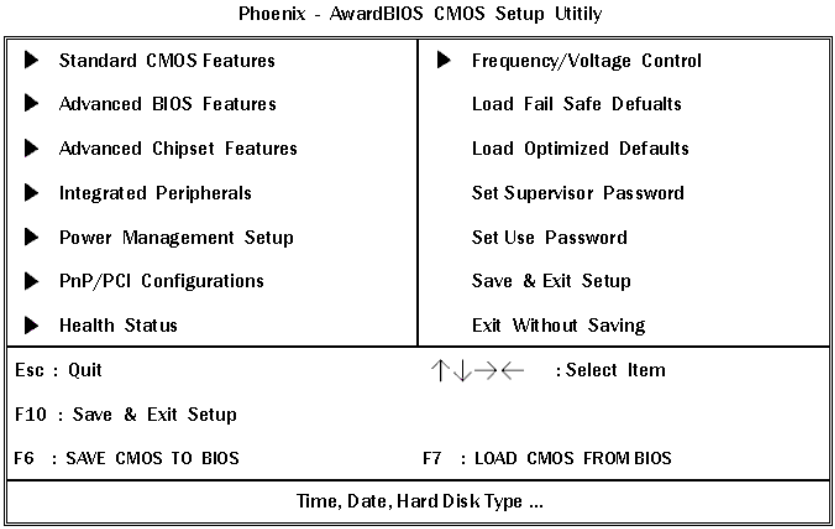



**Figure 5.1. Main Manu**

## Setup Items

The main menu includes the following main setup categories. Recall that some systems may not include all entries.

Standard CMOS Features

Use this menu for basic system configuration.

Advanced BIOS Features

Use this menu to set the Advanced Features available on your system.

Advanced Chipset Features

Use this menu to change the values in the chipset registers and optimize your system's performance.

Integrated Peripherals

Use this menu to specify your settings for integrated peripherals.

Power Management Setup

Use this menu to specify your settings for power management.

PnP / PCI Configuration

This entry appears if your system supports PnP / PCI.

Load Fail-Safe Defaults

Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate.

Load Optimized Defaults

Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While Award has designed the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs.

Supervisor / User Password

Use this menu to set User and Supervisor Passwords.

Save & Exit Setup

Save CMOS value changes to CMOS and exit setup.

Exit Without Save

Abandon all CMOS value changes and exit setup.

# Standard CMOS Setup

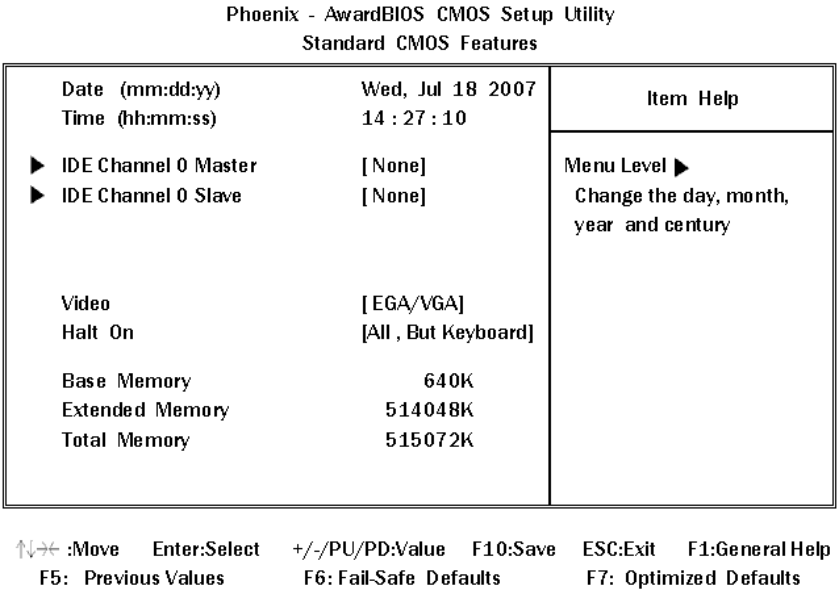



**Figure 5.2. Standard CMOS Setup**

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

# Main Menu Selections

This table shows the selections that you can make on the Main Menu.

**Table 5.2. Main Menu Selections**

| Item | Options | Description |
|---|---|---|
| Date | Month DD YYYY | Set the system date. Note that the 'Day' automatically changes when you set the date |
| Time | HH : MM : SS | Set the system time |
| IDE Channel 0 Master | Options are in its sub menu | Press <Enter> to enter the sub menu of detailed options |
| IDE Channel 0 Slave | Options are in its sub menu | Press <Enter> to enter the sub menu of detailed options |
| Video | EGA/VGA<br>CGA 40<br>CGA 80<br>MONO | Select the default video device<br>Usually select EGA/VGA. |
| Halt On | All Errors<br>No Errors<br>All, but Keyboard | Select the situation in which you want the BIOS to stop the POST process and notify you |
| Base Memory | N/A | Displays the amount of conventional memory detected during boot up |
| Extended Memory | N/A | Displays the amount of extended memory detected during boot up |
| Total Memory | N/A | Displays the total memory available in the system |

# IDE Adapters

The IDE adapters control the CF card. Use a separate sub menu to configure each CF card.

Use the legend keys to navigate through this menu and exit to the main menu. Use Table 5.3 to configure the hard disk.

**Table 5.3. IDE Adapters configurations**

| Item | Options | Description |
|---|---|---|
| IDE HDD Auto-detection | Press Enter | Press Enter to auto-detect the CF card on this channel. If detection is successful, it fills the remaining fields on this menu. |
| IDE Channel 0/2 Master/Slave | None<br>Auto<br>Manual | Selecting 'manual' lets you set the re-maining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc.<br>Note: PRECOMP=65535 means NONE ! |
| Capacity | Auto Display your CF card size | Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk checking program. |
| Access Mode | CHS<br>LBA<br>Large<br>Auto | Choose the access mode for this CF card. |
| The following options are selectable only if the 'IDE Channel 0/2 Master/Slave' item is set to 'Manual' | | |
| Cylinder | Min = 0<br>Max = 65535 | Set the number of cylinders for this CF card. |
| Head | Min = 0<br>Max = 255 | Set the number of heads for this CF card. |
| Precomp | Min = 0<br>Max = 65535 | **** **Warning** :<br>Setting a value of 65535 means no CF card |
| Landing zone | Min = 0<br>Max = 65535 | **** |
| Sector | Min = 0<br>Max = 255 | Number of sectors per track |

# Advanced BIOS Features Setup

This section allows you to configure your system for basic operation. You have the opportunity to select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.

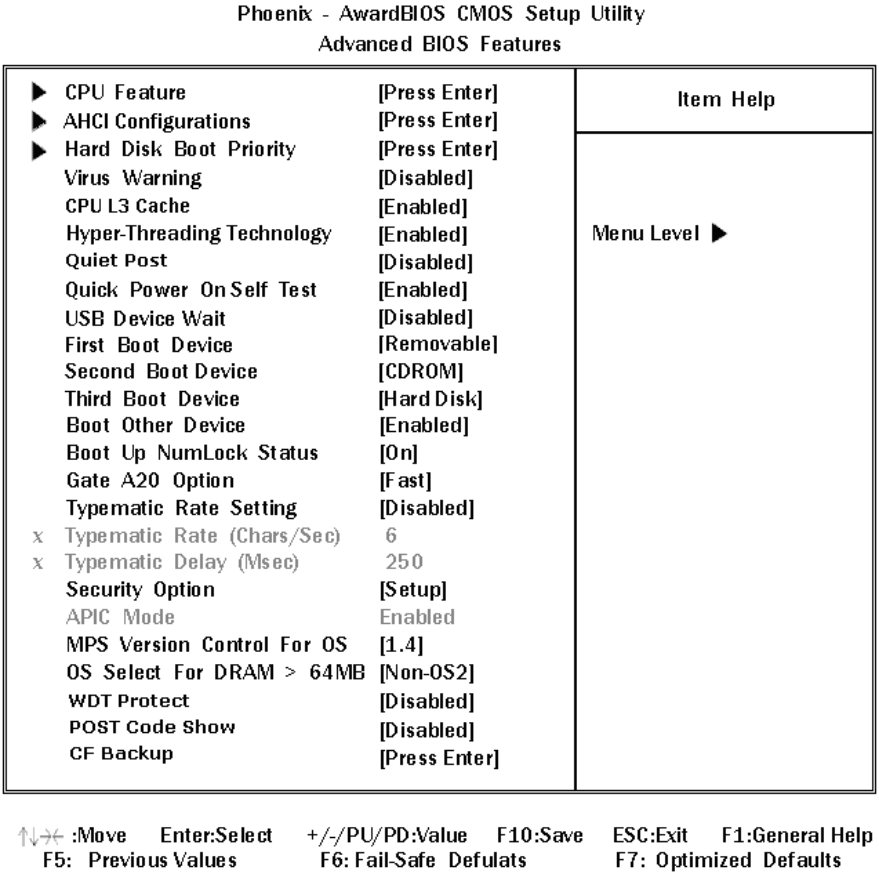



**Figure 5.3. Advanced BIOS Features Setup**

# CPU Feature

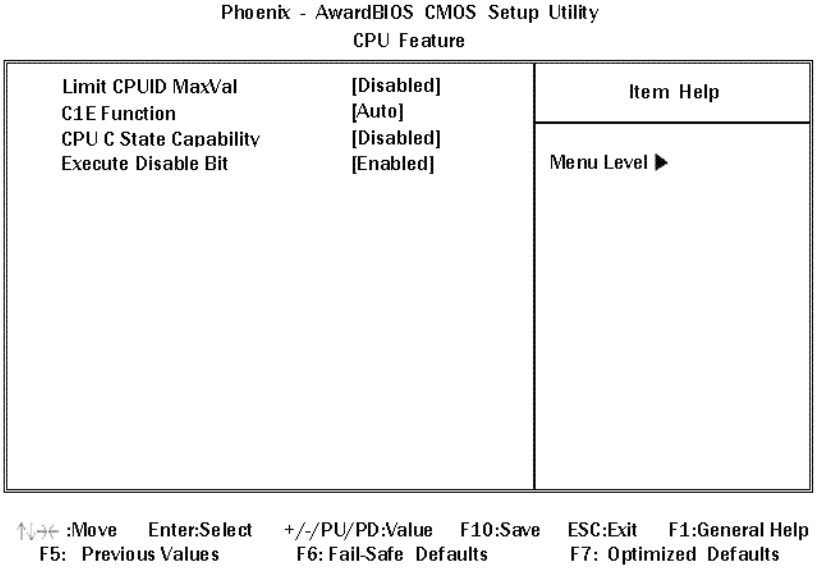
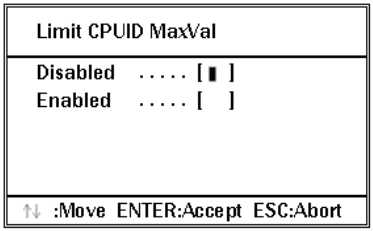
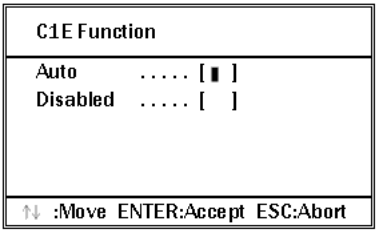
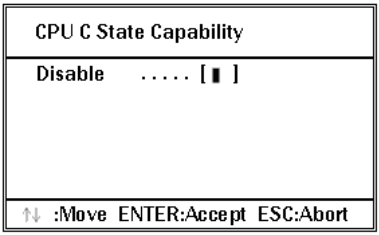
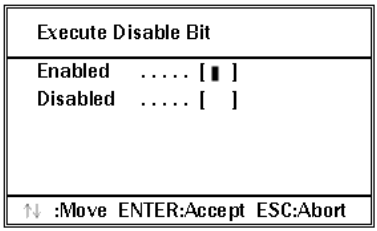



**Figure 5.4. CPU Feature**

Press <Enter> to configure the settings relevant to CPU Feature.

**Table 5.4. CPU Features Selections**

| Description | Choice |
|---|---|
| **Limit CPUID MaxVal**<br><br>Using some elder OS such as Windows98, CPUID larger than 3 is not available. Select "Enabled" with such OS. |  |
| **C1E Function**<br><br>CPU C1E Function Select. |  |

| Description | Choice |
|---|---|
| **CPU C State Capability**<br><br>Select the minimum C State value on C1E Function.<br>"Disable" is shown and other options are not available. |  |
| **Execute Disable Bit**<br><br>When disabled, forces the XD feature flag to always return 0. |  |

# AHCI Configurations

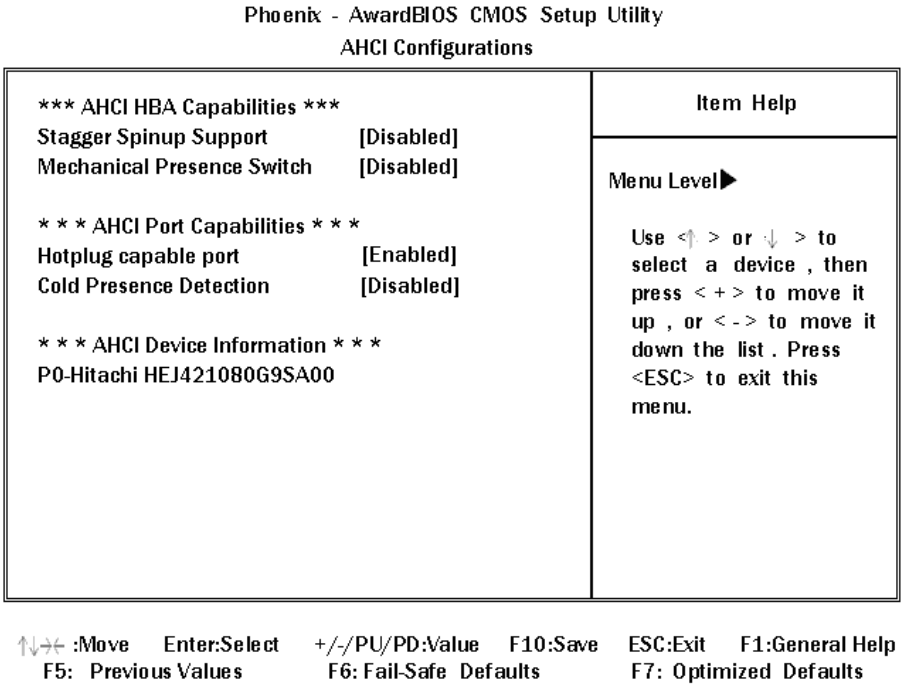
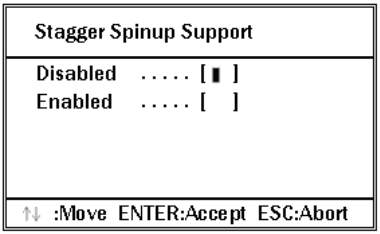
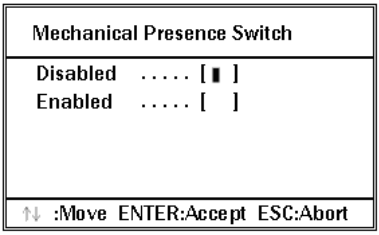
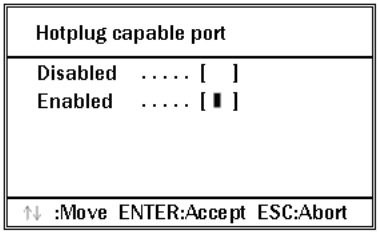
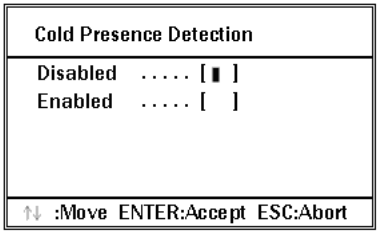



**Figure 5.4. AHCI Configurations**

This menu is not shown on default settings. In order to show this menu, select AHCI on “Integrated Peripherals” => “OnChip IDE Device” => “SATA Mode”, save it and reboot the PC with a SATA HDD.

**Table 5.4. AHCI Configuratons**

| Description | Choice |
|---|---|
| **Staggger Spinup Support**<br>When two HDDs or more are connected, each HDDs wakes up in delayed timings and inrush current is reduced. |  |

| Description | Choice |
|---|---|
| **Mechanical Presence Switch**<br><br>If disk drives connected when power was ON are removed / added, it can mechanically detect its switch. |  |
| **Hotplug capable port**<br><br>It enables the hotplug function of SATA. |  |
| **Cold Presence Detection**<br><br>It keeps the ports with no devices on POST and BOOT to be active conditions. If disk drives are added after BOOT, the system can detect it. |  |

# Hard Disk Boot Priority

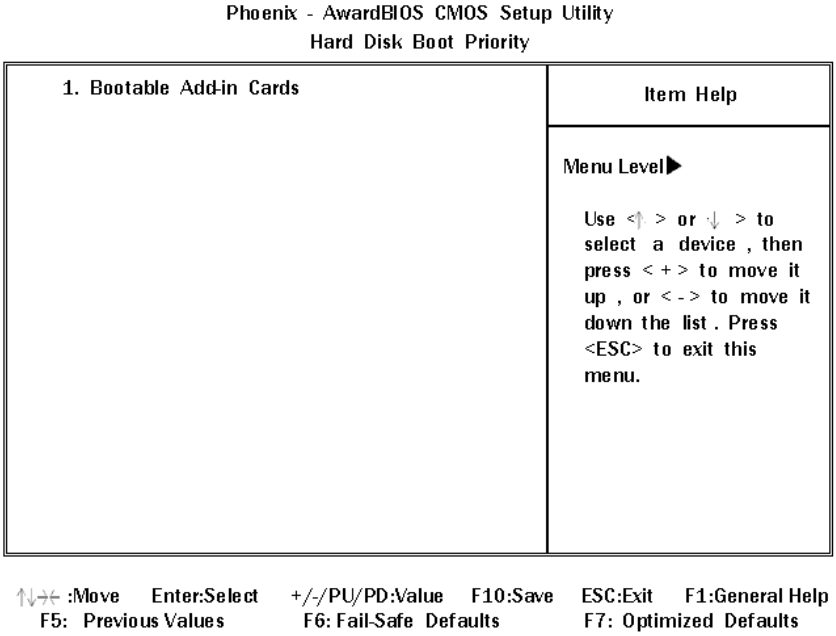



**Figure 5.5. Hard Disk Boot Priority**

With the field, there is the option to choose, aside from the hard disks connected, “Bootable add-in Cards” which refers to other external device.

## Virus Warning

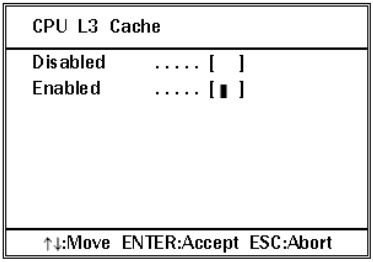
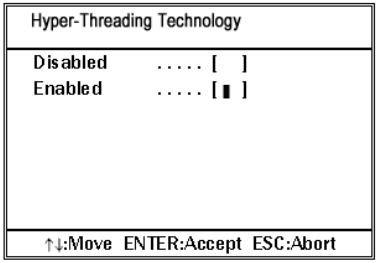
When enabled, you receive a warning message if a program (specifically, a virus) attempts to write to the boot sector or the partition table of the hard disk drive. You should then run an anti-virus program. Keep in mind that this feature protects only the boot sector, not the entire hard drive.

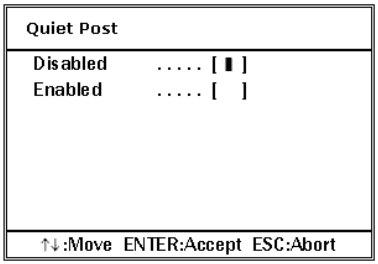
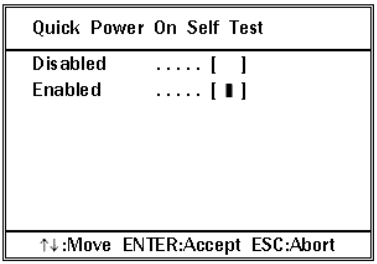
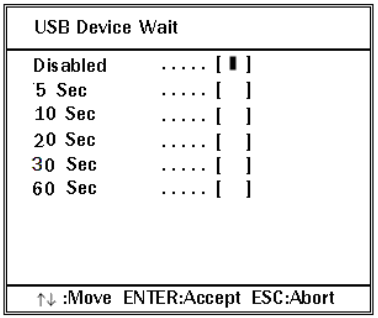
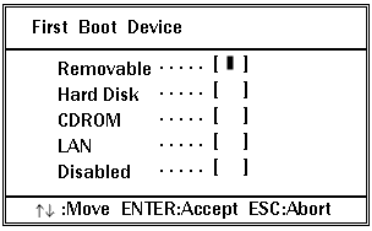
⚠ CAUTION

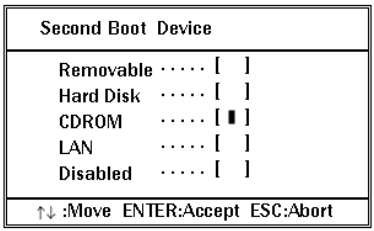
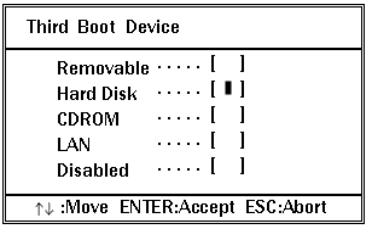
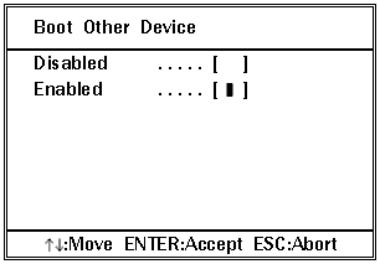
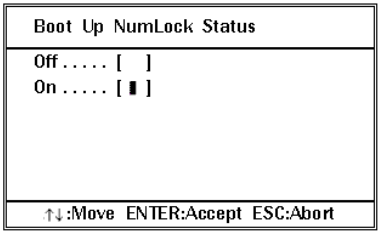
Many disk diagnostic programs that access the boot sector table can trigger the virus warning message. If you plan to run such a program, we recommend that you first disable the virus warning.

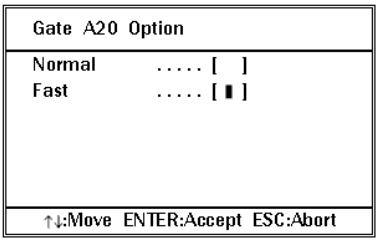
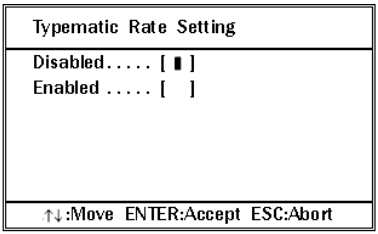
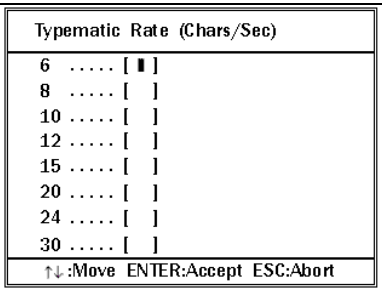
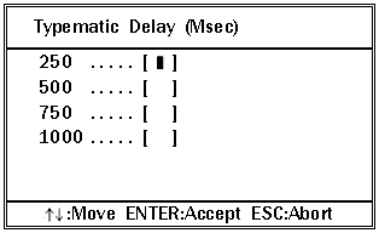
| | |
|---|---|
| Enabled | Activates automatically when the system boots up causing a warning message to appear when any-thing attempts to access the boot sector or hard disk partition table. |
| Disabled | No warning message will appear when anything attempts to access the boot sector or hard disk partition table. |

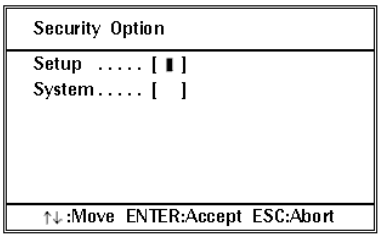
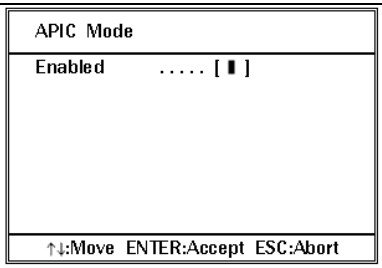
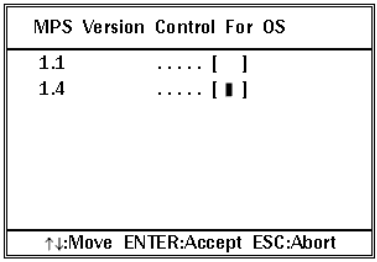
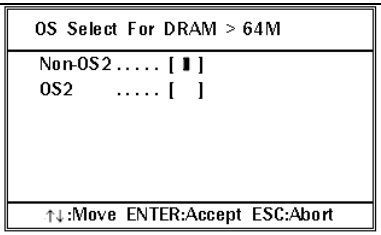
**Table 5.5. Advance BIOS Feature Selections**

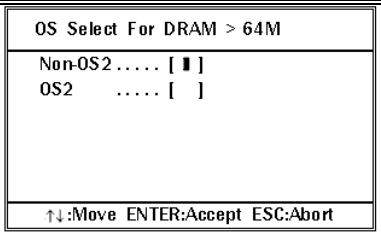
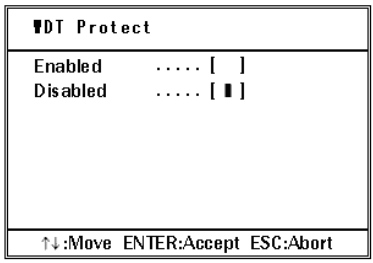
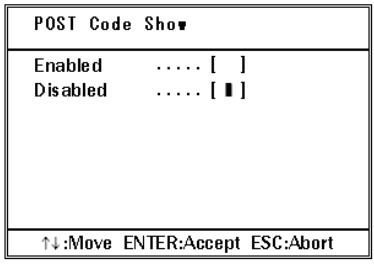
| Description | Choice |
|---|---|
| **CPU L3 Cache**<br><br>These allow you to enable (speed up memory access) or disable the cache function. |  |
| **Hyper-Threading Technology**<br><br>These allow you to enable or disable the Hyper-Threading function. |  |

| Description | Choice |
|---|---|
| **Quiet Post**<br><br>Skip certain self-diagnosis processes such as checking memory or other several devices for shorter bootup time. Default setting (Disabled) does not simplify the self-diagnosis process. |  |
| **Quick Power On Self Test**<br><br>Select Enabled to reduce the amount of time required to run the power-on self-test (POST). A quick POST skips certain steps. We recommend that you normally disable quick POST. Better to find a problem during POST than lose data during your work |  |
| **USB Device Wait**<br><br>When USB devices, which need longer time to be booted, are connected, the boot possibly can not be processed in normal condition. To address such cases, this setting specifies the waiting time for BIOS and delays the start of the access to the USB devices. Therefore, the boot will be delayed by the specified waiting time. |  |
| **First Boot Device**<br><br>The BIOS attempts to load the operating system from the devices in the sequence selected in these items. |  |

| Description | Choice |
|---|---|
| **Second Boot Device**<br><br>The BIOS attempts to load the operating system from the devices in the sequence selected in these items. |  |
| **Third Boot Device**<br><br>The BIOS attempts to load the operating system from the devices in the sequence selected in these items. |  |
| **Boot Other Device**<br><br>The BIOS attempts to load the operating system from the devices in the sequence selected in these items. |  |
| **Boot Up NumLock Status**<br><br>Toggle between On or Off to control the state of the NumLock key when the system boots. When toggled On, the numeric keypad generates numbers instead of controlling cursor operations. |  |

| Description | Choice |
|---|---|
| **Gate A20 option**<br><br>Gate A20 refers to the way the system addresses memory above 1 MB (extended memory). When set to Fast, the system chipset controls Gate A20.<br><br>When set to Normal, a pin in the keyboard controller controls Gate A20. Setting Gate A20 to Fast improves system speed, particularly with OS/2 and Windows |  |
| **Typematic Rate Setting**<br><br>When Disabled, the following two items (Typematic Rate and Typematic Delay) are irrelevant. Keystrokes repeat at a rate determined by the keyboard controller in your system. When Enabled, you can select a typematic rate and typematic delay. |  |
| **Typematic Rate (Chars/Sec)**<br><br>When the typematic rate setting is enabled, you can select a typematic rate (the rate at which character repeats when you hold down a key) of 6, 8, 10, 12, 15, 20, 24 or 30 characters per second. |  |
| **Typematic Delay (Msec)**<br><br>When the speed setting for the key input is enabled, you can specify the interval of waiting time for the continuous key input. |  |

<table>
<tr><th>Description</th><th>Choice</th></tr>
<tr><td>Security Option<br><br>Select whether the password is required every time the system boots or only when you enter setup. If you have set a password, select whether the password is required every time the System boots, or only when you enter Setup.<br><br>System: The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.<br><br>Setup: The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.</td><td> 
</td></tr>
<tr><td colspan="2">Note: To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.</td></tr>
<tr><td>APIC Mode<br><br>APIC stands for Advanced Programmable Interrupt Controller.<br><br>Note : This item is show only</td><td> 
</td></tr>
<tr><td>MPS Version Control For OS<br><br>Use the Multiprocessor Specification (MPS) for OS option to specify the MPS version to be used. MPS version 1.4 added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability.</td><td> 
</td></tr>
<tr><td>OS Select For DRAM > 64M<br><br>Select the operating system that is running with greater than 64MB of RAM on the system.</td><td> 
</td></tr>
</table>

| Description | Choice |
|---|---|
| **OS Select For DRAM > 64M**<br><br>Select the operating system that is running with greater than 64MB of RAM on the system. |  |
| **WDT Protect**<br><br>WDT protect can be enabled to monitor the situations that halt BIOS bootup such as malfunction of the connected device(s), accidental noise, and some other unpredictable happenings. When Enabled, and if BIOS startup is halted during the startup, the system is reset and rebooting is attempted. |  |
| **Post Code Show**<br><br>During BIOS startup, the Post Code is displayed at the right upper corner of the screen. The Post Code is shown, however, after the initialization of graphic device is finished and the system is ready for screen display. |  |
| **CF Backup**<br><br>Selecting this option allows you to launch a tool for creating the backup of CF and restoring it. This can be used to backup your current environment as it is. For details, please refer to the explanation below (*1). | --- |

*1 About the CF Backup Feature

To use the CF Backup feature, a separately-available CF for backup is required. The CF for backup must be the CF of the same model or larger capacity. Using the CF that is not our optional parts can be the cause of unidentified problems and it must be ensured that the CF works with your system without problem before using this feature.

Also, before performing backup, read the licensing terms of your operating system carefully so that the backup is carried out within the scope of given license.

Followings are the steps to use the CF Backup feature.

<Using the CF Backup Feature>

(1) Connect display and keyboard to the box computer.
(2) Insert the CF and the CF for backup to the respective CF slot before turning the power on.
(3) Press the “DEL” key before the startup to invoke the BIOS setting screen, and select “CF Backup” from menu.

(4) Follow the messages on the screen to proceed with the process. For the copy process, the Source Disk (the CF to be backed up) and the Destination Disk (the CF for backup) must be specified. The contents of the Source Disk can be lost if the Disks are wrongly assigned: ensure the correct operation by carefully reading the displayed message and performing the procedures accordingly.

(5) When the backup process is finished, the message “BACKUP finish, Press any key reboot.” is displayed. Enter any one of the alphabet keys from A to Z. The system reboots upon the key input.

(6) Backup completes when the above steps are done.

# Advanced Chipset Features Setup

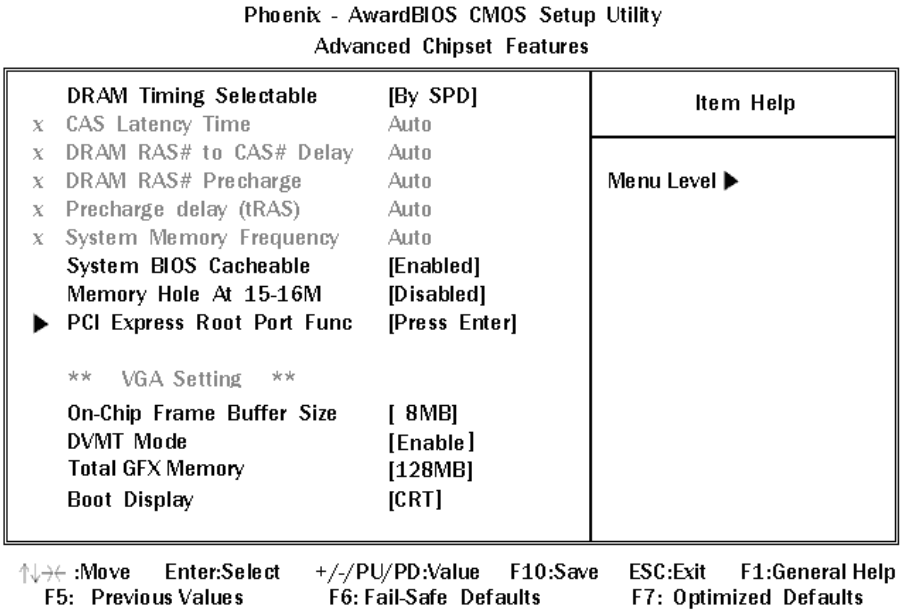
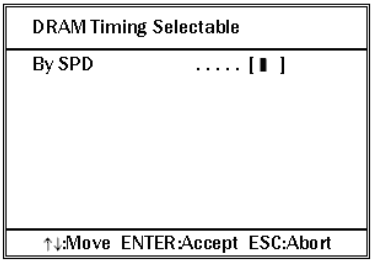
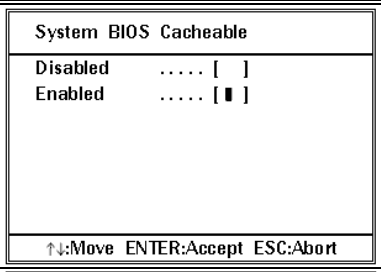
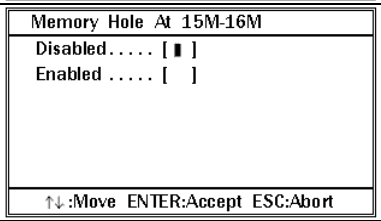
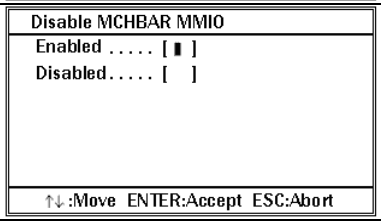



**Figure 5.6. Advanced Chipset Features Setup**

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

**Table 5.6. Advance Chipset Feature Selections**

| Description | Choice |
|---|---|
| **DRAM Timing Selectable**<br>This item is fixed. Let it be the default value (By SPD). Memory frequency is fixed to 800MHz. |  |

| Description | Choice |
|---|---|
| **System BIOS Cacheable**<br>Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result. |  |
| **Memory Hole At 15M-16M**<br>In order to improve performance, certain space in memory can be reserved for ISA card. This memory must be mapped into the memory space below 16MB. |  |
| **Disable MCHBAR MMIO**<br>MCHBAR means “Memory mapped range for IMC register”. MMIO means “Memory Mapped IO”. Let it be the default value (Enabled). |  |

# PCI Express Root Port Function

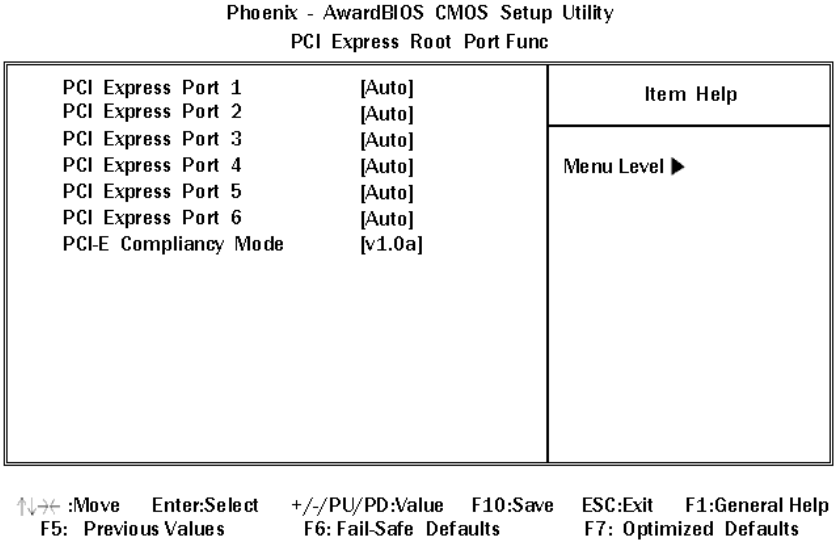



**Figure 5.7. PCI Express Root Port Function**

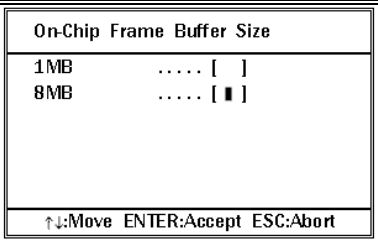
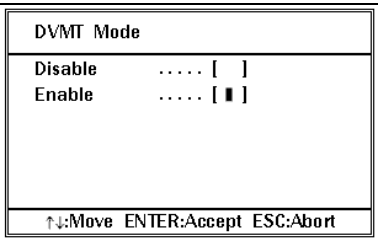
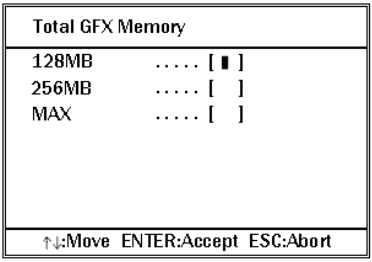
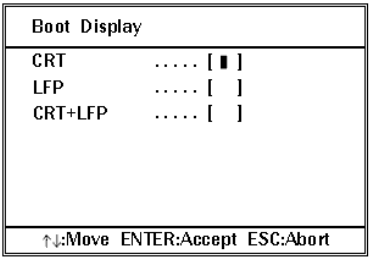
**Table 5.7. PCI Express Root Port Function Selections**

| Description | Choice |
|---|---|
| **PCI Express Port 1/2/3/4/5/6**<br><br>This item allows you to enable or disable or Auto configure the PCI Express Port 1/2/3/4/5/6. | PCI Express Port 1<br>Auto ..... [ ▮ ]<br>Enabled ..... [ ]<br>Disabled ..... [ ]<br>↑↓:Move ENTER:Accept ESC:Abort |
| **PCI-E Compliancy Mode**<br><br>This item allows you to set PCI Express compliancy mode. | PCI-E Compliancy Mode<br>v1.0a ..... [ ▮ ]<br>v1.0 ..... [ ]<br>↑↓:Move ENTER:Accept ESC:Abort |

# VGA setting

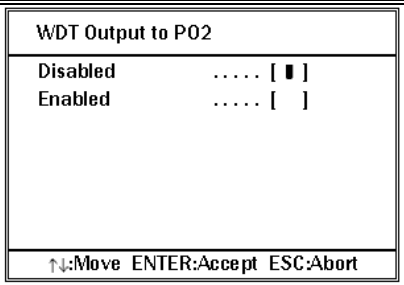
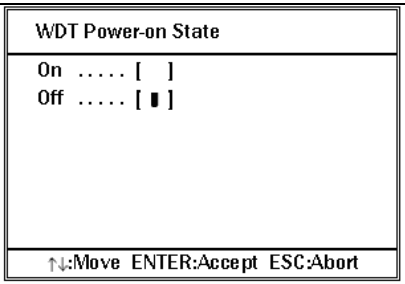
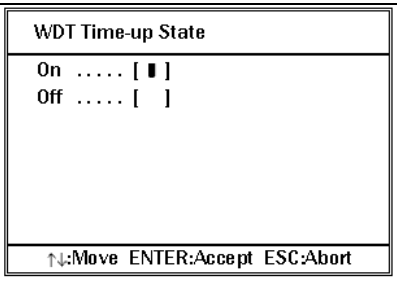
The field under the On-Chip VGA Setting and their defaults settings are:

**Table 5.8. VGA Setting Selections**

| Description | Choice |
|---|---|
| **On-Chip Frame Buffer Size**<br><br>When Enabled, a fixed VGA frame buffer from A000h to BFFFh and a CPU-to-PCI write buffer are implemented. |  |
| **DVMT Mode**<br><br>Allows you to set the Dynamic Video Memory Technology (DVMT) mode. |  |
| **Total GFX Memory**<br><br>Decide total GFX memory. |  |
| **Boot Display**<br><br>This item allows you to select the boot display device. |  |

# Watch Dog Timer Setting

Output settings for PO2 of the watchdog timer in RAS port

| Description | Choice |
|---|---|
| **WDT Output to PO2**<br><br>Set watchdog timer output to PO2.<br>Selecting "Enabled" connects the output of the watchdog timer to the PIO2 pin in the RAS connector. The output value changes depending on the "WDT Power-on State" and "WDT Time-up State" settings. |  |
| **WDT Power-on State**<br><br>This item is enabled with "WDT Output to PO2" set to "Enabled". Set the state of output from the watchdog timer when the power is turned on. |  |
| **WDT Time-up State**<br><br>This item is enabled with "WDT Output to PO2" set to "Enabled". Set the state of output from the watchdog timer when the watchdog timer causes a time-out |  |

# Integrated Peripherals

This section sets configurations for your hard disk and other integrated peripherals. The first screen shows three main items for user to select. Once an item selected, a submenu appears. Details follow.

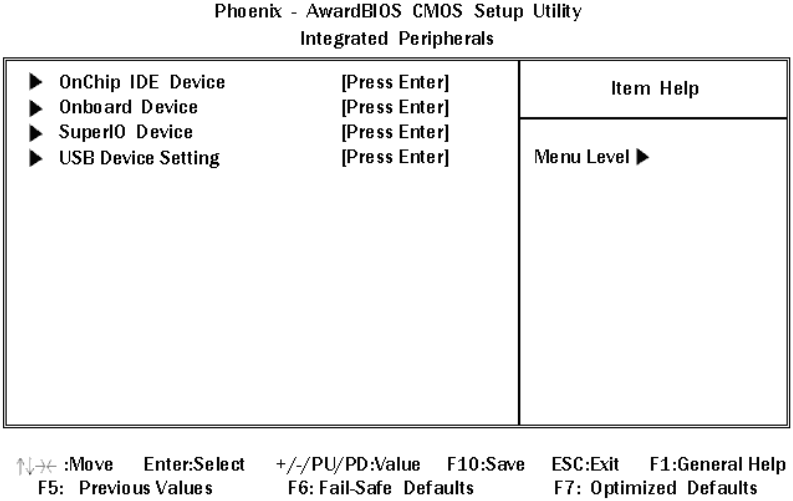



**Figure 5.8. Integrated Peripherals**

# OnChip IDE Device

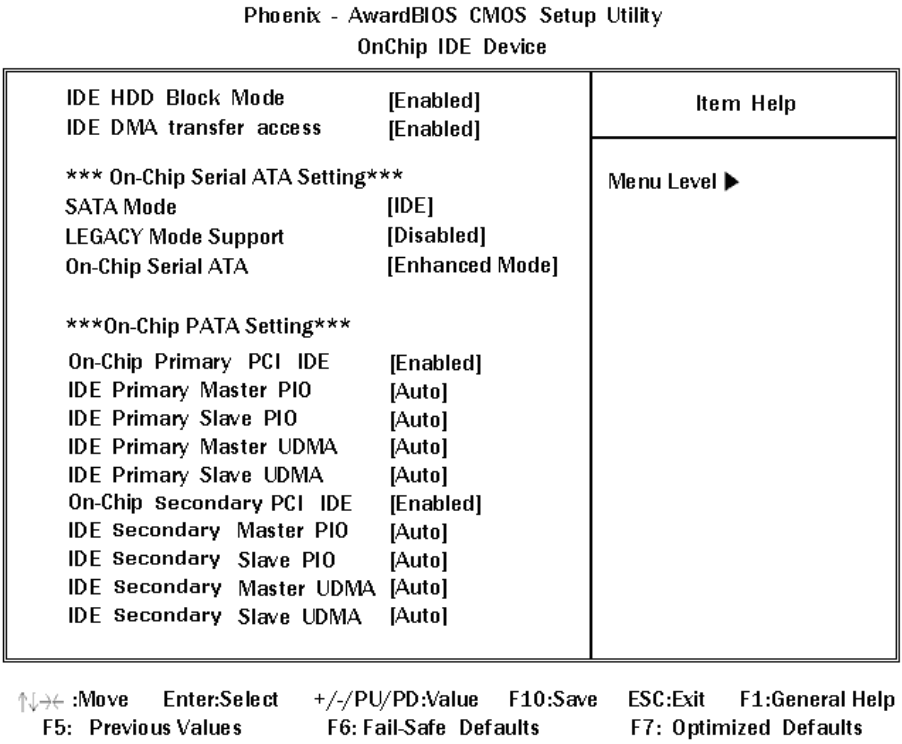
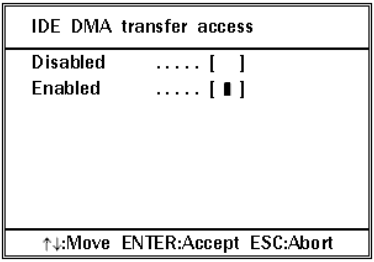
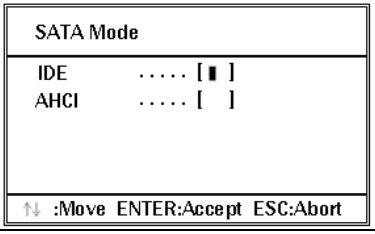
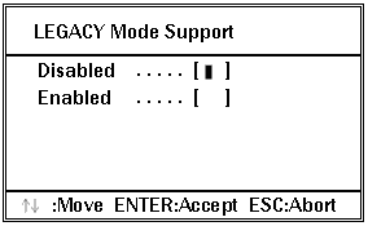
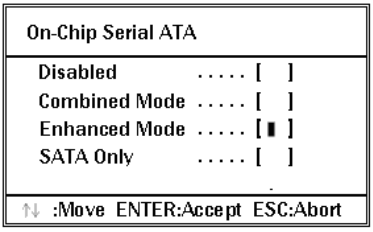
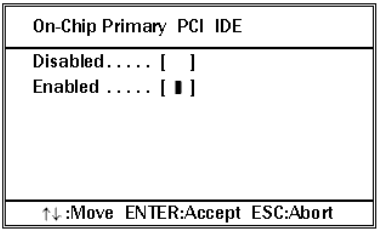



**Figure 5.9. OnChip IDE Device**

**Table 5.9. On Chip IDE Device Selections**

| Description | Choice |
|---|---|
| **IDE HDD Block Mode**<br><br>Block mode is also called block transfer, multiple commands, or multiple sectors read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support. | IDE HDD Block Mode<br>Disabled ..... [ ]<br>Enabled ..... [■]<br>↑↓:Move ENTER:Accept ESC:Abort |

| Description | Choice |
|---|---|
| **IDE DMA transfer access**<br><br>This item allows you to enable or disable the IDE DMA transfer access. |  |
| **SATA Mode**<br><br>Set SATA hard disk mode in IDE or AHCI mode. |  |
| **LEGACY Mode Support**<br><br>A SATA HDD can work in LEGACY mode. |  |
| **On-Chip Serial ATA**<br><br>Disabled: Disable SATA controller.<br>Combined Mode: Enable the combination of SATA and PATA. Up to three IDE devices are available, one for SATA and two for PATA.<br>Enhanced Mode: Enable both SATA and PATA. Up to three IDE drives are provided for this mode.<br>SATA Only: Set SATA to operate in legacy mode. |  |
| **On-Chip Primary PCI IDE**<br><br>The integrated peripheral controller contains an IDE interface with support for 2 IDE channels. Select Enabled to activate each channel separately. |  |

| Description | Choice |
|---|---|
| **IDE Primary Master / Slave PIO**<br><br>The two IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for the one IDE device that the onboard IDE interface supports. In Auto mode, the system automatically determines the best mode for the device. | IDE Primary Master PIO<br>Auto ..... [ ▮ ]<br>Mode 0 ..... [ ]<br>Mode 1 ..... [ ]<br>Mode 2 ..... [ ]<br>Mode 3 ..... [ ]<br>Mode 4 ..... [ ]<br>↑↓:Move ENTER:Accept ESC:Abort<br><br>IDE Primary Slave PIO<br>Auto ..... [ ▮ ]<br>Mode 0 ..... [ ]<br>Mode 1 ..... [ ]<br>Mode 2 ..... [ ]<br>Mode 3 ..... [ ]<br>Mode 4 ..... [ ]<br>↑↓:Move ENTER:Accept ESC:Abort |
| **IDE Primary Master/Slave UDMA**<br><br>UDMA (Ultra DMA) is a DMA data transfer protocol that utilizes ATA commands and the ATA bus to allow DMA commands to transfer data at a maximum burst rate of 33 MB/s. When you select Auto in the two IDE UDMA fields, the system automatically determines the optimal data transfer rate for each IDE device. | IDE Primary Master UDMA<br>Disabled ..... [ ]<br>Auto ..... [ ▮ ]<br>↑↓:Move ENTER:Accept ESC:Abort<br><br>IDE Primary Slave UDMA<br>Disabled ..... [ ]<br>Auto ..... [ ▮ ]<br>↑↓:Move ENTER:Accept ESC:Abort |

# Onboard Device

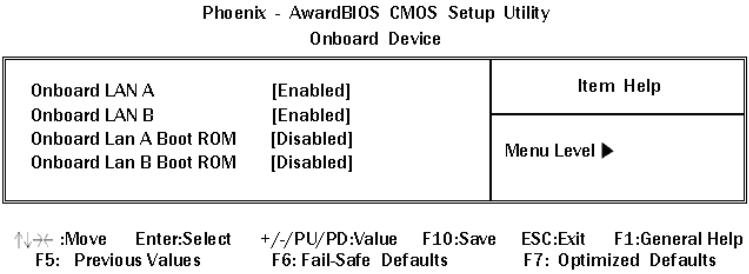
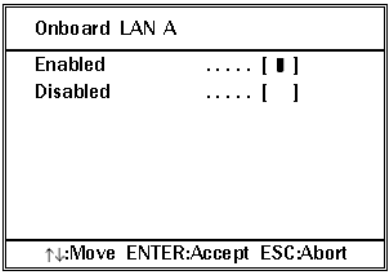
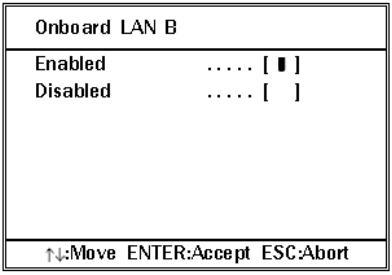
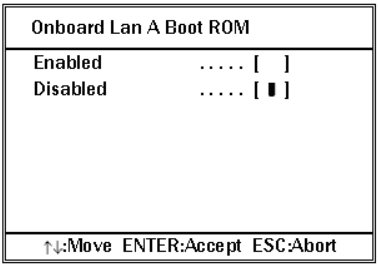
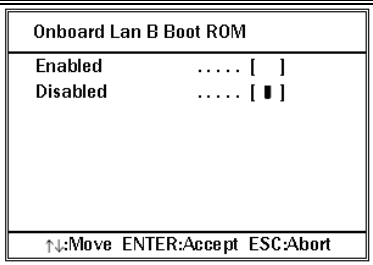



**Figure 5.10. Onboard Device**

**Table 5.11. On board device Selections**

| Description | Choice |
|---|---|
| **Onboard LAN A**<br>Select "Disabled" if you don't want to use Onboard LAN A controller. |  |
| **Onboard LAN B**<br>Select "Disabled" if you don't want to use Onboard LAN B controller. |  |
| **Onboard Lan A Boot ROM**<br>Select "Enabled" when PXE network boot up via onboard LAN-A controller is to be performed. |  |

| Description | Choice |
|---|---|
| **Onboard Lan B Boot ROM**<br><br>Select “Enabled” when PXE network boot up via onboard LAN-B controller is to be performed. |  |

# Super IO Device

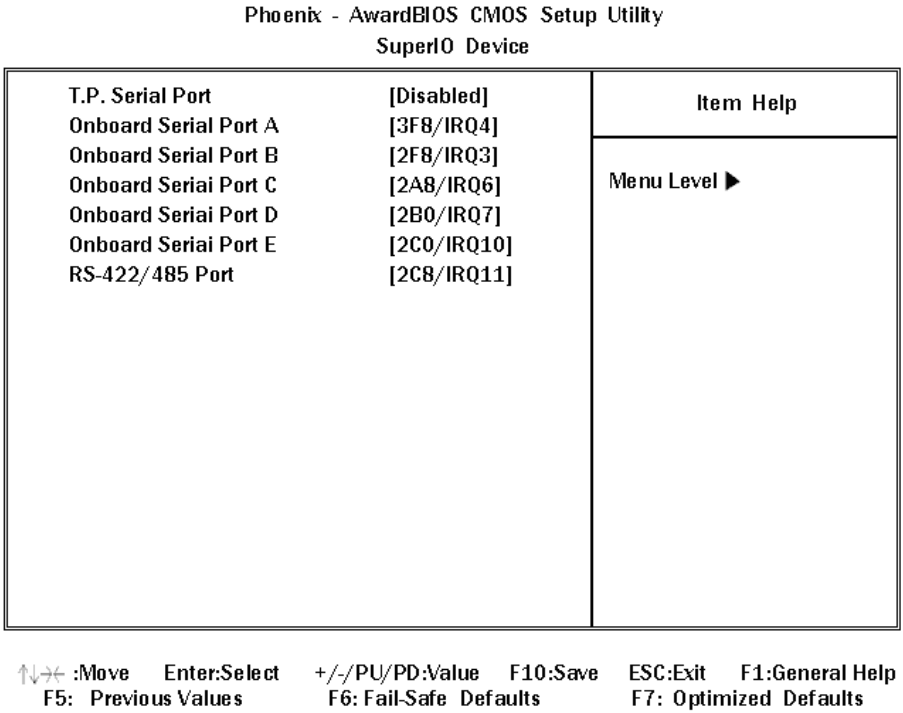
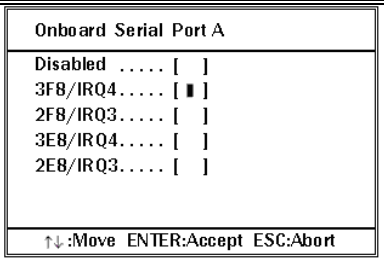
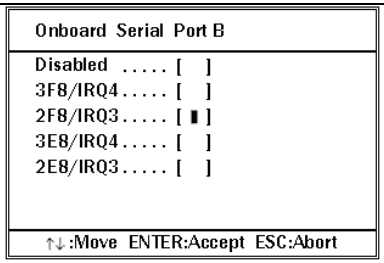
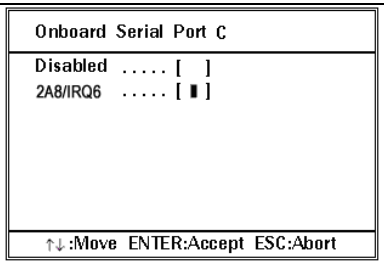
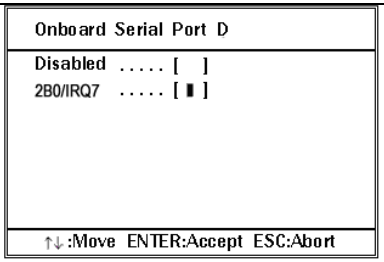
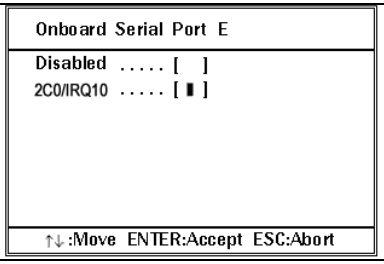
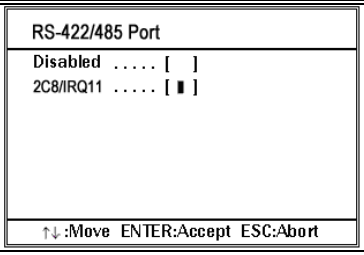



**Figure 5.11. Super IO Device**

**Table 5.12. Super I/O device Selections**

| Description | Choice |
|---|---|
| **T.P. Serial Port**<br>Enable or disable touch panel serial port.<br>In normal cases, set it as “Disable”. | T.P. Serial Port<br>LFP ..... [ ]<br>OPTION ..... [ ]<br>Disabled ..... [■]<br>↑↓ :Move ENTER:Accept ESC:Abort |

| Description | Choice |
|---|---|
| **Onboard Serial Port A**<br>Select an address and corresponding interrupt for the serial port A. |  |
| **Onboard Serial Port B**<br>Select an address and corresponding interrupt for the serial port B. |  |
| **Onboard Serial Port C**<br>Select an address and corresponding interrupt for the serial port C. |  |
| **Onboard Serial Port D**<br>Select an address and corresponding interrupt for the serial port D. |  |
| **Onboard Serial Port E**<br>Select an address and corresponding interrupt for the serial port E. |  |

| Description | Choice |
|---|---|
| **RS-422/485 Port**<br>This serial port is for the RS422/485 inside the RAS connector. |  |

# USB Device Setting

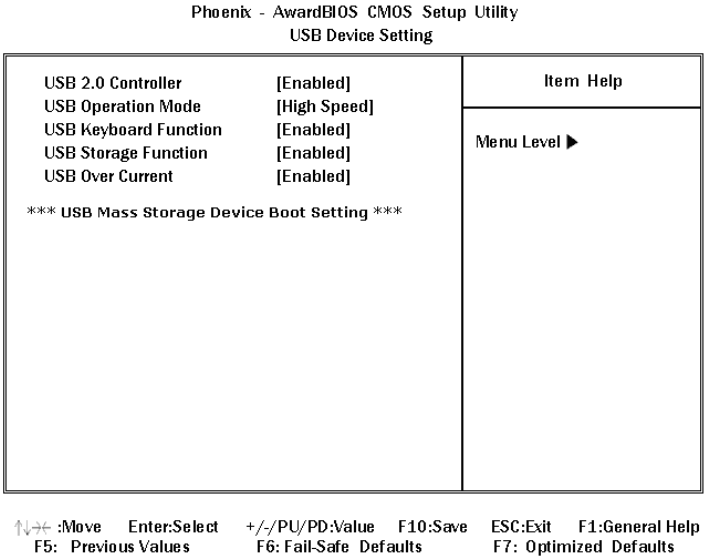
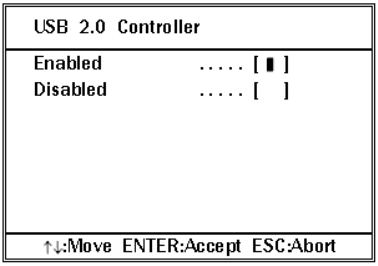
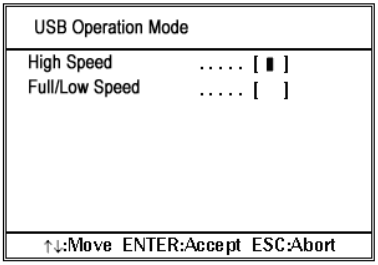
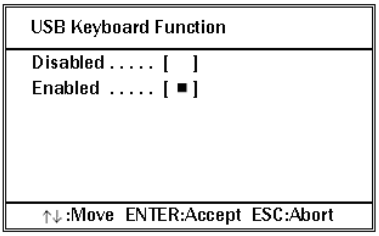
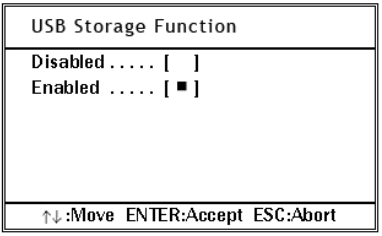
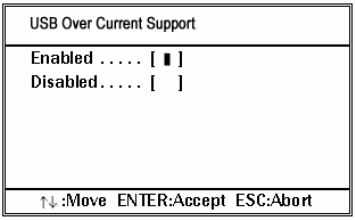



**Figure 5.12. USB Device Setting**

**Table 5.12. USB Device Setting Selections**

| Description | Choice |
|---|---|
| **USB 2.0 Controller**<br><br>Enable or disable the Onboard USB 2.0 function.<br>In normal cases, use it while "Enable". |  |
| **USB Operation Mode**<br><br>Select one of USB operation mode. |  |

| Description | Choice |
|---|---|
| **USB Keyboard Function**<br><br>Select “Enabled” when a USB keyboard has to be used on the OS that does not support USB. |  |
| **USB Storage Function**<br><br>Select “Enabled” when using the USB storage. Using OS which supports USB such as Windows XP, you can use USB storages even if this item is set to “Disabled”. |  |
| **USB Over Current Support**<br><br>Select “Enabled” or “Disabled” over USB Over Current. Normally, use the system with the Enabled setting. |  |

# Power Management Setup

The Power Management Setup allows you to configure you system to most effectively save energy while operating in a manner consistent with your own style of computer use.

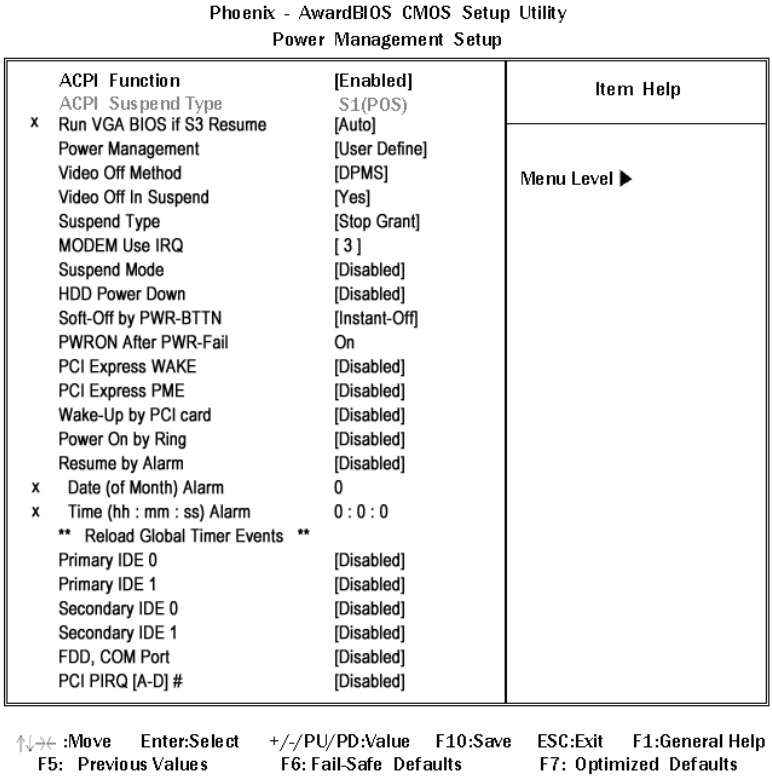
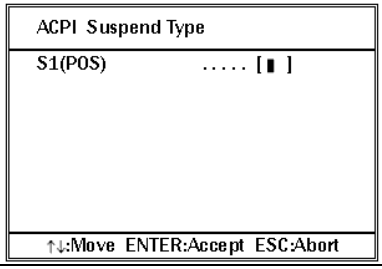
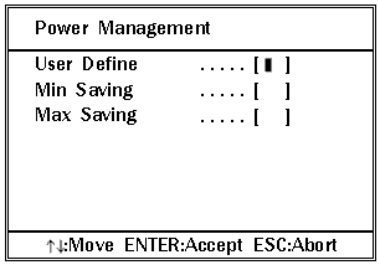
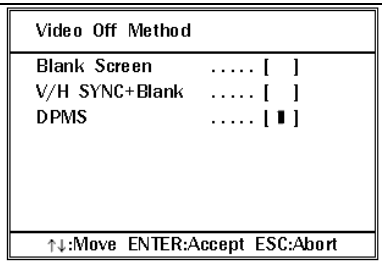
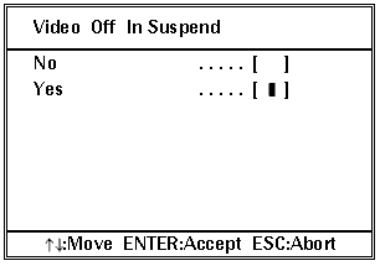
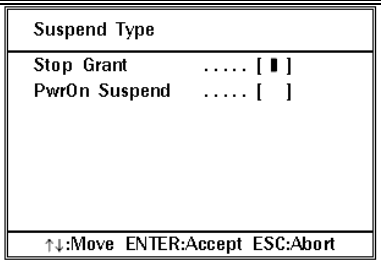
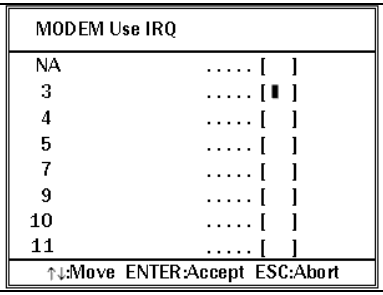
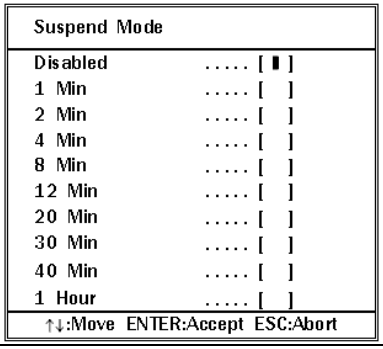


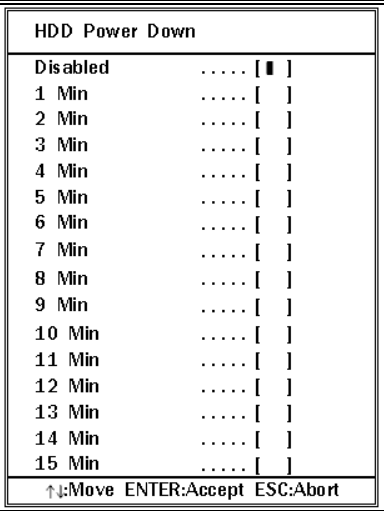
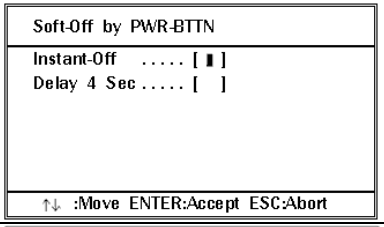
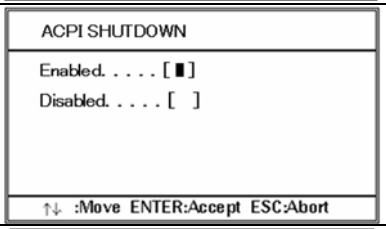
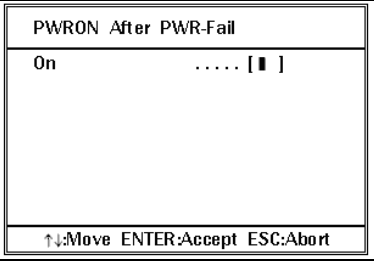

**Figure 5.12. Power Management Setup**

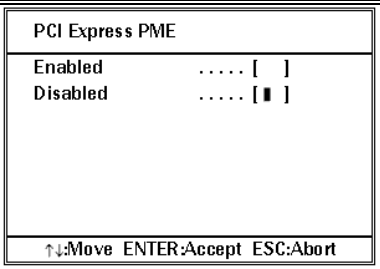
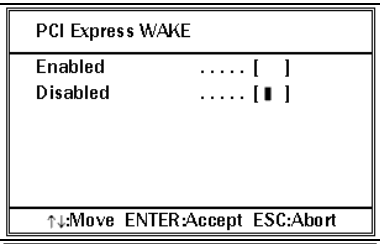
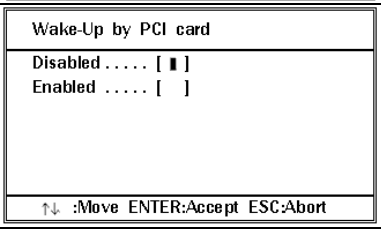
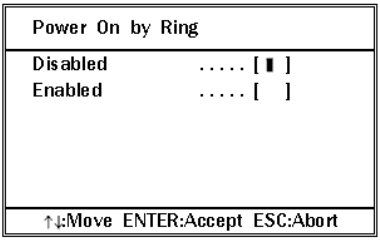
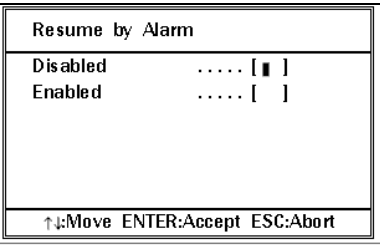
**Table 5.13. Power Management setup Selections**

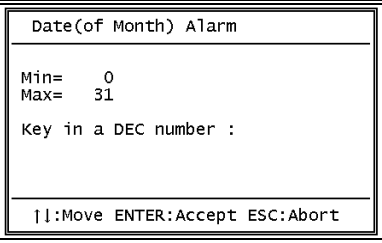
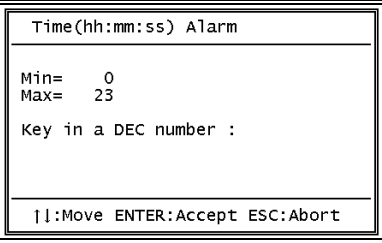
| Description | Choice |
|---|---|
| **ACPI Function**<br>When set to 'Enabled', turns on the ACPI Function. By default, this field is "Enabled". | ACPI Function<br>Enabled ..... [▮]<br>Disabled ..... [ ]<br>↑↓ :Move ENTER:Accept ESC:Abort |

| Description | Choice |
|---|---|
| **Note:** ACPI (Advanced Configuration and Power Interface) is a power management specification that makes hardware status information available to the operating system ACPI enables a computer to turn its peripherals on and off for improved power management. It also allows the computer to be turned on and off by external devices, so that mouse or keyboard activity wakes up the computer. | |
| **ACPI Suspend Type**<br>Only "S1 (POS)" is supported for the ACPI suspense mode. |  |
| **Power Management**<br>This setting controls each timer function for the doze mode, stand-by mode, and suspense mode. Using this category, you can select the type (degree) of power saving function.<br>**User Define:** Each mode can be set separately. If enabled, the time duration for this setting ranges from 1 minute to 1 hour. (Exception: the time duration for HDD power down ranges from 1 to 15 minutes.)<br>**Min Saving:** Performs minimum power management. (stand-by mode=1 hour, suspense mode=1 hour, HDD power down=15 minutes)<br>**Max Saving:** Performs maximum power management. (stand-by mode=1 minutes, suspense mode=1 minutes, HDD power down=1 minutes,) |  |
| **Video Off Method**<br>This item decides how the display is blanked.<br>**Blank Screen:** This option writes blanks to the video buffer.<br>**V/H SYNC+Blank:** This option disconnects the power for the vertical and horizontal synchronizing ports of the system, and writes blanks to the video buffer.<br>**DPMS:** Signals for the initial power management of the display. |  |
| **Video Off In Suspend**<br>This option sets how to turn off the monitor display. |  |

| Description | Choice |
|---|---|
| **Suspend Type**<br>Enables the selection of “Suspend type”. Available options are "Stop Grant" and "PwrOn Suspend". |  |
| **MODEM Use IRQ**<br>If you want to resume the system from power saving mode on the incoming call to modem, specifies here the interruption request line (IRQ) used by the modem.<br>To use this function, you need to connect the Fax / Modem to Wake On Modem connector of keyboard computer. |  |
| **Suspend Mode**<br>If no power management event happens within the specified time duration, the CPU clock stops and the video signal is suspended.<br>When a power management event is detected, the full powered functions are recovered.<br>* If the item of USB Keyboard Support is set [Enabled], this function is not available. |  |

| Description | Choice |
|---|---|
| **HDD Power Down**<br>If set in "Enabled", the hard disk drive goes into the power saving mode when no system operation is done after the specified time duration. Other devices continues to be active. |  |
| **Soft-Off by PWR-BTTN**<br>In case of Soft-Off (S5) by the power button, specifies the delay time to wait till the power button takes effect. In "Instant-Off", the power button takes effect immediately after pushed down. In "Delay 4 sec", the power button need to be pushed and held for 4 seconds to take effect. Note that the power button is controlled by the OS in case of Windows. |  |
| **ACPI SHUTDOWN**<br>By default, this field is Enabled.<br>Shutdown confirmation is Displayed when you run the shutdown(BX-110n-DC6124-C01 only) |  |
| **PWRON After PWR-Fail**<br>Only "On" is supported for the PWRON After PWR-Fail. This feature is activated whenever a power is returned after any types of power failures such as outage. |  |

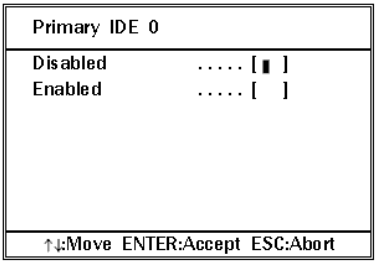
| Description | Choice |
|---|---|
| **PCI Express PME**<br>By default, this field is Disabled.<br>For Add on PCI-E Card PME.<br>Usually select “Disabled”. |  |
| **PCI Express WAKE**<br>By default, this field is “Disabled”.<br>Selecting “Enabled” enables On board LAN “WOL” function.<br>Note that the “Wake-Up by PCI Card” setting below should be Enable alike. |  |
| **Wake-Up by PCI card**<br>Selecting “Enable” enables On board LAN “WOL” function.<br>Note that the “PCI Express Wake” setting below should be Enable alike. |  |
| **Power On by Ring**<br>When set to "Enabled", you can boot the system by incoming call (Ring signal) to the modem connected SERIAL A, B, C, D or E. |  |
| **Resume by Alarm**<br>When Enabled, your can set the date and time at which the RTC (real-time clock) alarm awakens the system. |  |

| Description | Choice |
|---|---|
|  |  |

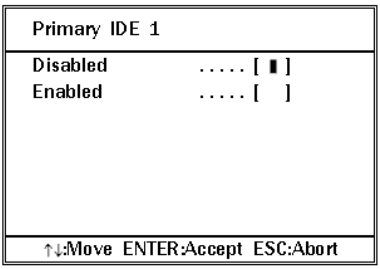




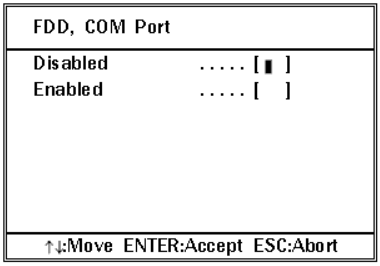
Reload Global Timer Events ：When Enabled, an event occurring on each listed device restarts the global timer for Standby mode.



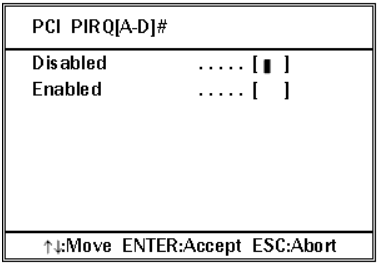












# PnP/PCI Configuration Setup

This section describes configuring the PCI bus system. PCI, or Personal Computer Interconnect, is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

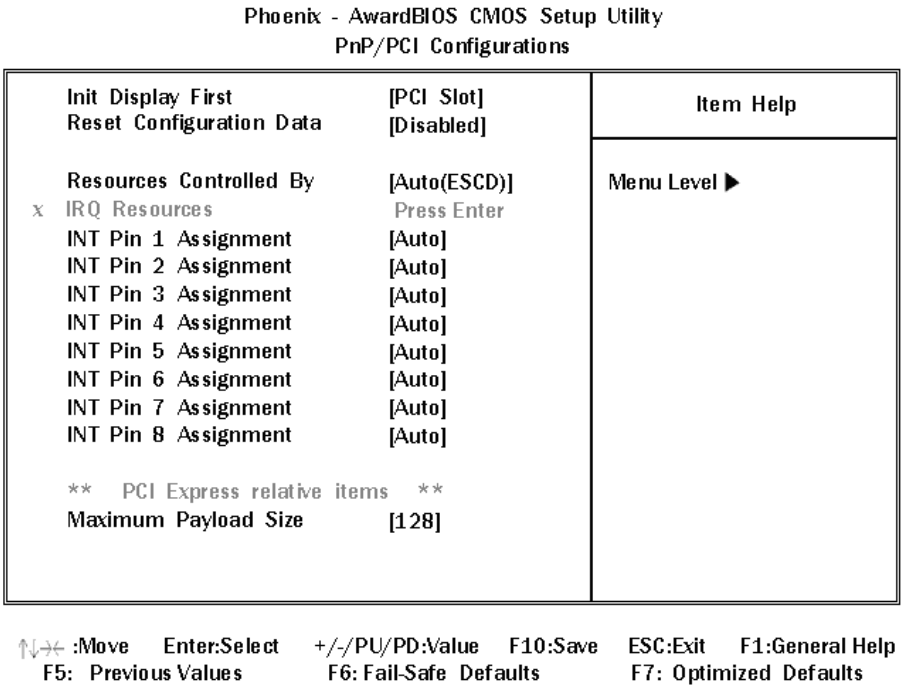
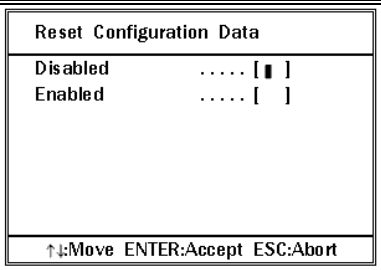
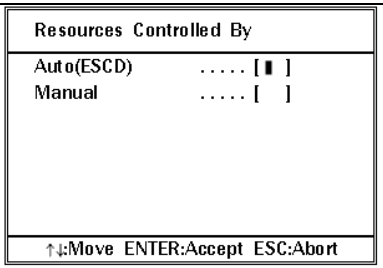



**Figure 5.13. PnP/PCI Configuration Setup**

**Table 5.14. PCI PnP/PCI Configuration Setup Selections**

| Description | Choices |
|---|---|
| **Init Display First**<br>Initialize the onboard video display before initializing any other display device on the system. Thus the onboard display becomes the primary display. | Init Display First<br>PCI Slot ..... [▮ ]<br>Onboard ..... [ ]<br>↑↓:Move ENTER:Accept ESC:Abort |

| Description | Choices |
|---|---|
| **Reset Configuration Data**<br>Normally, you leave this field Disabled. When you want to reset the resource assignment for the change of Enable / Disable of COM or other reasons, set this field to Enabled. After BIOS setup, ESCD (Extended System Configuration Data) should be reset. |  |
| **Resource Controlled By**<br>The Award Plug and Play BIOS can automatically configure all the boot and Plug and Play – compatible devices. If you select Auto, all the interrupt request (IRQ) and DMA assignment fields disappear, as the BIOS automatically assigns them |  |

# IRQ n Resources

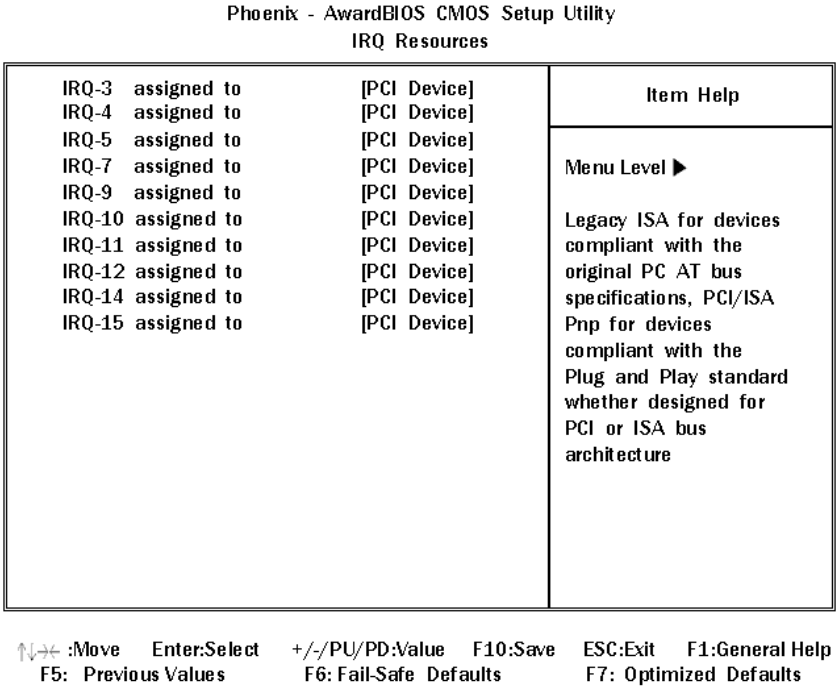


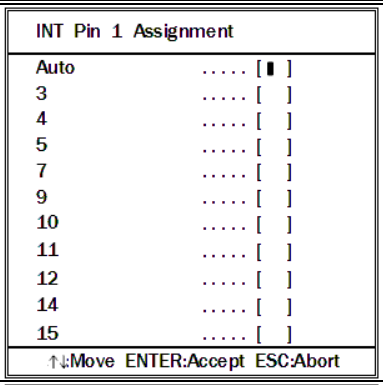
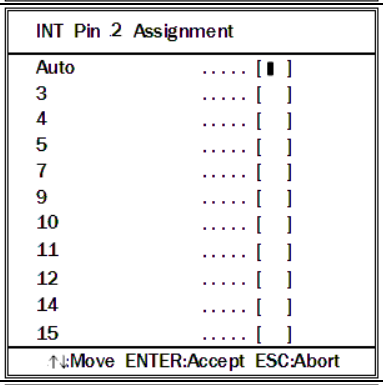
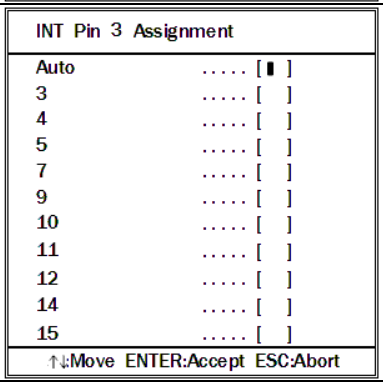

**Figure 5.14. IRQ n Resources**

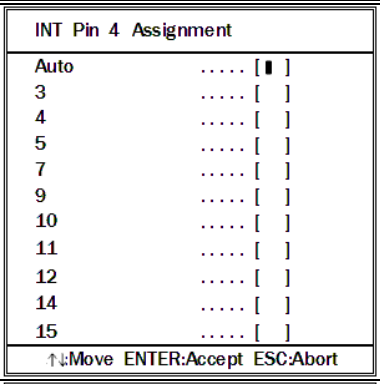
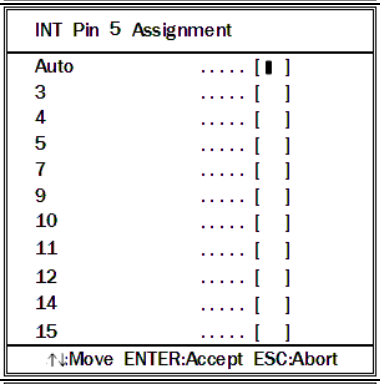
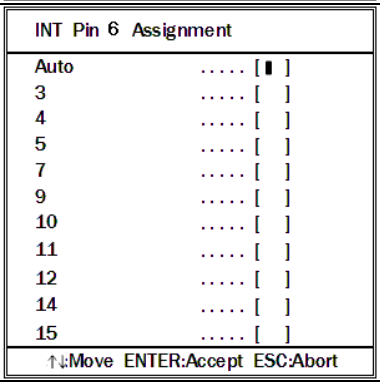
When resources are controlled manually, assign each system interrupt as on of the following type, depending on the type of device using the interrupt.

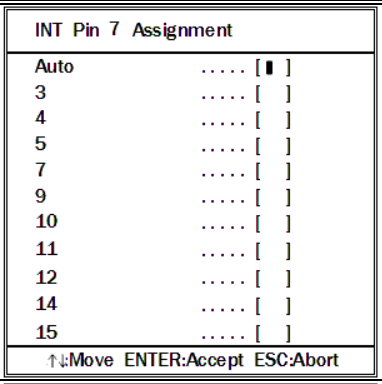
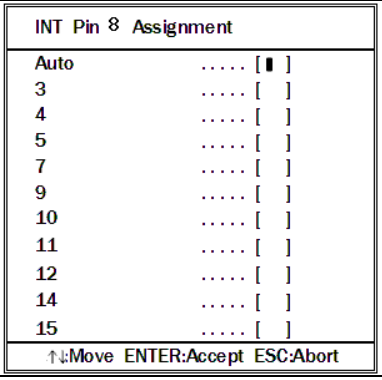
Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt (Such as IRQ4 for serial port 1)

PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

The Choice: Legacy ISA and PCI/ISA PnP

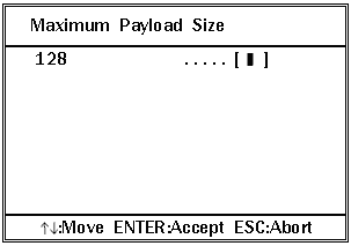
| Description | Choices |
|---|---|
| **INT Pin 1 Assignment**<br>Usually select “Auto”.<br>Devices(s) using this INT :<br>Display Controller<br>- Bus 0 Dev 2 Func 0<br>USB 1.0/1.1 UHCI Controller<br>- Bus 0 Dev 29 Func 3 |  |
| **INT Pin 2 Assignment**<br>Usually select “Auto”.<br>Devices(s) using this INT :<br>Multimedia Device<br>- Bus 0 Dev 30 Func 2 |  |
| **INT Pin 3 Assignment**<br>Usually select “Auto”.<br>Devices(s) using this INT :<br>USB 1.0/1.1 UHCI Controller<br>- Bus 0 Dev 29 Func 2 |  |

| Description | Choices |
|---|---|
| **INT Pin 4 Assignment**<br>Usually select “Auto”.<br>Devices(s) using this INT ：<br>IDE Controller<br>- Bus 0 Dev 31 Func 2<br>USB 1.0/1.1 UHCI Controller<br>- Bus 0 Dev 29 Func 1<br>SMBus Controller<br>- Bus 0 Dev 31 Func 3 |  |
| **INT Pin 5 Assignment**<br>Usually select “Auto”.<br>Devices(s) using this INT ：<br>Network Controller<br>- Bus 1 Dev 8 Func 0<br>Simple Communication Controller<br>- Bus 0 Dev 30 Func 3 |  |
| **INT Pin 6 Assignment**<br>Usually select “Auto”.<br>Devices(s) using this INT ：<br>- Reserved |  |

| Description | Choices |
|---|---|
| **INT Pin 7 Assignment**<br>Usually select “Auto”.<br>Devices(s) using this INT ：<br>- Reserved |  |
| **INT Pin 8 Assignment**<br>Usually select “Auto”.<br>Devices(s) using this INT ：<br>USB 1.0/1.1 UHCI Controller<br>- Bus 0 Dev 29 Func 0<br>USB 2.0 EHCI Controller<br>- Bus 0 Dev 29 Func 7 |  |

# PCI Express relative items

**Table 5.15. PCI Express Relative Items Selections**

| Description | Choices |
|---|---|
| **Maximum Payload Size**<br>Set maximum TLP payload size for the PCI Express Devices. The unit is byte. Only 128 is shown. |  |

# PC Health Status

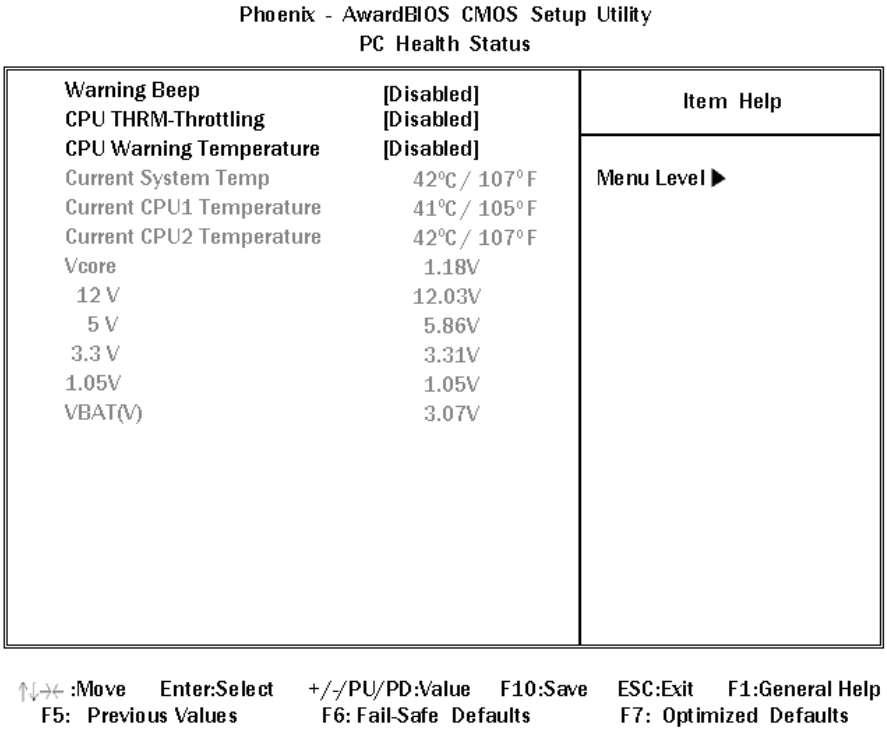
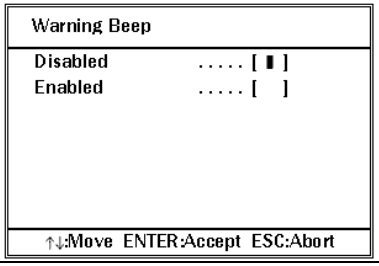
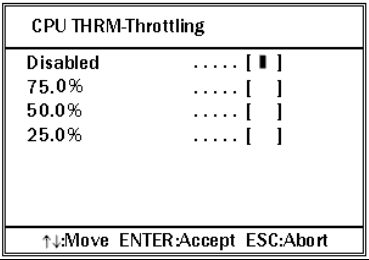
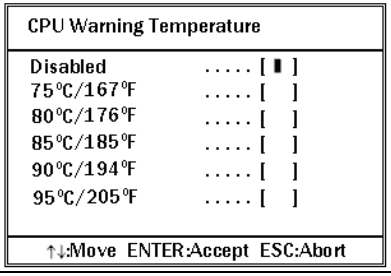



**Figure 5.15. PC Health Status**

The BIOS shows the PC health status in this window.

**Table 5.16. PC Health Status Selections**

| Description | Choices |
|---|---|
| **Warning Beep**<br>Disabled: Disables this function.<br>Enabled: Beep will sound as a warning when the temperature exceeds the value set in "CPU Waning Temperature" below. |  |
| **CPU THRM-Throttling**<br>When the temperature exceeds the value set in "CPU Waning Temperature" below, the slot ring is activated in selected percentages to restrain the heat generation from CPU. Note that the operation in Windows is not supported. |  |
| **CPU Warning Temperature**<br>When using "Warning Beep" and "CPU THRM-Throttling" above, specifies the threshold temperature to the CPU temperature. |  |
| Current System Temp. | This field displays the current system temperature. |
| Current CPU1 / CPU2 Temp. | This field displays the current CPU temperature. |
| Vcore / +12V / +5V / +3.3V / +1.05V / VBAT | This field displays the current voltage. |

# Frequency/Voltage Control

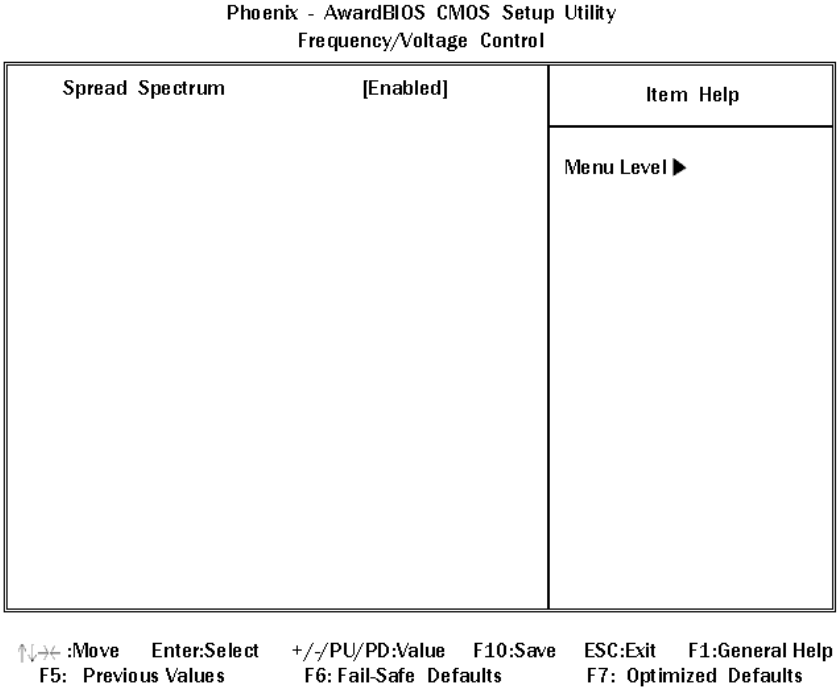



**Figure 5.16. Frequency/Voltage Control**

**Table 5.17. Frequency/Voltage Control Selections**

| Description | Choices |
|---|---|
| **Spread Spectrum**<br>When the system clock generator pulses, the extreme values of the pulse generate excess EMI. Enabling pulse spectrum spread modulation changes the extreme values from spikes to flat curves, thus reducing EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device. | Spread Spectrum<br>Disabled . . . . . [ ]<br>Enabled . . . . . [▮ ]<br>↑↓:Move ENTER:Accept ESC:Abort |

# Defaults Menu

Selecting “Defaults” from the main menu shows you two options which are described below

**Load Fail-Safe Defaults**

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

***Load Fail-Safe Defaults (Y/N) ? N***

Pressing ‘Y’ loads the BIOS default values for the most stable, minimal-performance system operations.

**Load Optimized Defaults**

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

***Load setup Defaults (Y/N) ? N***

Pressing ‘Y’ loads the default values that are factory settings for optimal performance system operations.

# Supervisor /User Password Setting

You can set either supervisor or user password, or both of then. The differences between are:

**SUPERVISOR PASSWORD:** can enter and change the options of the setup menus.

**USER PASSWORD:** just can only enter but do not have the right to change the options of the setup menus. When you select this unction, the following message will appear at the center of the screen to assist you in creating a password.

**ENTER PASSWORD:**

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

**PASSWORD DISABLED:**

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to “System”, the password will be required both at boot and at entry to Setup. If set to “Setup”, prompting only occurs when trying to enter Setup.

# Exit Selecting

**Save & Exit Setup**

**Pressing <Enter> on this item asks for confirmation:**

***Save to CMOS and EXIT (Y/N)? Y***

Pressing “Y” stores the selections made in the menus in CMOS – a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

**Exit Without Saving**

**Pressing <Enter> on this item asks for confirmation:**

***Quit without saving (Y/N)? Y***

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

# POST Messages

During the Power On Self-Test (POST), if the BIOS detects an error requiring you to do something to fix, it will either sound a beep code or display a message.

If a message is displayed, it will be accompanied by:

**PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP**

# POST Beep

Currently there are two kinds of beep codes in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps. The other code indicates that your DRAM error has occurred. This beep code consists of a single long beep repeatedly.

# Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes messages for both the ISA and the EISA BIOS.

**CMOS battery has failed**

CMOS battery is no longer functional. It should be replaced.

**Disk boot failed**

**[INSERT SYSTEM DISK AND PRESS ENTER]**

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain proper system boot files. Make sure the connection of boot drive and its content.

EISA configuration checksum error

[PLEASE RUN EISA CONFIGURATION UTILITY]

The EISA non-volatile RAM checksum is incorrect or cannot correctly read the EISA slot. This can indicate either the EISA non-volatile memory has become corrupt or the slot has been configured incorrectly. Also be sure the card is in-stalled firmly in the slot.

EISA configuration is incomplete

[PLEASE RUN EISA CONFIGURATION UTILITY]

The slot configuration information stored in the EISA non-volatile memory is incomplete.

⚠ CAUTION

When either of these errors appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

Error encountered initializing hard drive

Disk drive cannot be initialized. Be sure all recording media such as HDD/SSD/CF are installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

Error initializing hard disk controller

Cannot initialize disk drive controller. Be sure all recording media such as HDD/SSD/CF are installed correctly. Also be sure the correct hard drive type is selected in Setup.

EISA configuration invalid

[PLEASE RUN EISA CONFIGURATION UTILITY]

The non-volatile memory containing EISA configuration information was programmed incorrectly or has become corrupt. Re-run EISA configuration utility to correctly program the memory.

⚠ CAUTION

When either of these errors appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

Keyboard error or no keyboard present

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

Memory address error at…

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory parity error at…

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

Memory size has changed since last BOOT

Memory has been added or removed since the last boot. In EISA mode use Configuration Utility to reconfigure the memory configuration. In ISA mode enter Setup and enter the new memory size in the memory fields.

Memory verify error at…

Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.

Offending address not found

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

Offending segment

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

Press a key to REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

Press F1 to disable NMI, F2 to REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

RAM parity error

[CHECKING FOR SEGMENT…]

Indicates a parity error in Random Access Memory.

Detected unexpected EISA board

[PLEASE RUN EISA CONFIGURATION UTILITY]

A valid board ID was found in a slot that was configured as having no board ID.

⚠ CAUTION

When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

Detected unexpected EISA board

[PLEASE RUN EISA CONFIGURATION UTILITY]

The board installed is not responding to the ID request, or no board ID has been found in the indicated slot.

⚠ CAUTION

When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

Slot not empty

Indicates that a slot designated as empty by the EISA Configuration Utility actually con-tains a board.

⚠ CAUTION

When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

System halted, (CTRL-ALT-DEL) to REBOOT…

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

Board in slot is incorrect

[PLEASE RUN EISA CONFIGURATION UTILITY]

The board ID does not match the ID stored in the EISA non-volatile memory.

⚠ CAUTION

When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

Hard disk(s) fail (80)

Disk drive reset failed.

Hard disk(s) fail (40)

Disk drive controller diagnostics failed.

Hard disk(s) fail (20)

Disk drive initialization error.

Hard disk(s) fail (10)

Unable to recalibrate disk drive.

Hard disk(s) fail (08)

Sector Verify failed.

Keyboard is locked out – Unlock the key

This product does not support Keyboard Lock. If this message was shown, keyboard controller may be broken.

Keyboard error or no keyboard present

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

Manufacturing POST loop

System will repeat POST procedure infinitely while the P15 of keyboard controller is pulled low. This is also used for M/B burn in test.

BIOS ROM checksum error – System halted

The checksum of ROM address F0000H-FFFFFH is bad. It indicates that hardware broke down or content of ROM was changed.

Memory test fail

BIOS reports the memory tests fail if the onboard memory is tested error.

**Error loading operating system**

**Invalid System disk**

It indicates that Boot Record Program in Disk (not in BIOS) failed to load OS. Make sure content of Disk.

Locations and Settings of CMOS/ROM Clear SW

If an unexpected activation failure occurs due to the BIOS setting, the CMOS/ROM clear SW can be set in order to disable the BIOS setting and start up the system.

In the normal operation, leave the CMOS/ROM clear SW to the factory setting (1-4, 2-3 : OFF).

## ⚠ CAUTION

Touching the product immediately after it is switched off may cause burning.
When setting the SW, let it cool completely beforehand.

Remove the cover on the back from the cabinet.

(Number of screws, cover: 3)

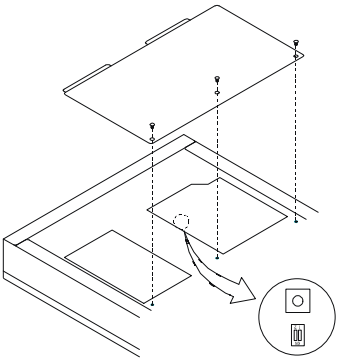


Figure 5.17. Removal of Cover and Heat Sink and Locations of CMOS/ROM Clear SW

(1) When the cover on the back is removed, the CMOS clear push button (S2) and ROM clear dip switch (S1) will appear, as shown in the above figure.
(2) Push the CMOS clear push button (S2), hold down for around ten seconds, and then release the push button.
(3) Turn 1-4 of ROM clear dip switch (S1) on.
(4) Install the cover to the place where it was. Do not tighten screws with excess force.
(5) Start the BIOS setup screen for resetting and then turn off the power.
(6) Remove the cover and then turn the ROM clear dip switch (S1) off.
(7) Mount the cover in the reverse procedure of removing them.

## ⚠ CAUTION

- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 1 - 1.5kgf·cm.
- When removing the screws which secure the cover on the back, follow instructions below. In case of mishandling, the threaded hole could be stripped.
- When removing the cover, use screwdriver tips shown below respectively:
  Cover : (+)No.0
- Do not use the electric screwdriver when removing screws of the cover.

# 6. Appendix

## Memory Map

| Memory Segments | Comments |
|---|---|
| 00000h - 9FFFh | 0 - 640K DOS Region |
| A0000h - BFFFFh | Video Buffer |
| B0000h - B7FFFh | Monochrome Adapter range |
| C0000h - CFFFFh | Video BIOS |
| D0000h - DFFFFh | Expansion Area |
| E0000h - EFFFFh | Extended System BIOS Area |
| F0000h - FFFFFh | System BIOS Area |
| 100000h - FFFFFFFFh | Extended Memory Area |
| 00100000 - Top of Main Memory | Main DRAM Address Range |
| Top of Main Memory | Extended SMRAM Address Range |
| Top of Main Memory To 4GB | PCI Memory Address Range |
| FEC0000h - FECFFFFFh,<br>FEE00000h - FEEFFFFFh | APIC configuration space |
| FFE0000h - FFFFFFFFh | High BIOS Area |

**Figure 6.1. Memory Map**

# I/O Port Addresses

**Table 6.1. I/O Port Addresses**

| Address | Size | Description |
|---|---|---|
| 0000 - 000F | 16 bytes | DMA controller |
| 0010 - 001F | 16 bytes | Reserved |
| 0020 - 0021 | 2 bytes | PIC interrupt controller |
| 0022 - 003F | 30 bytes | Reserved |
| 0040 - 0043 | 4 bytes | System timer 1 |
| 0044 - 005F | 24 bytes | Reserved |
| 0060 | 1 byte | Keyboard controller |
| 0061 | 1 byte | NMI, speaker controller |
| 0062 - 0063 | 2 bytes | Reserved |
| 0064 | 1 byte | Keyboard controller |
| 0065-006F | 11bytes | Reserved |
| 0070 - 0073 | 4 bytes | RTC real time clock |
| 0074 - 007F | 12bytes | Reserved |
| 0080 - 0090 | 17 bytes | DMA page register |
| 00A0 - 00A1 | 2 bytes | Interrupt controller 2 |
| 00A2 - 00BF | 28 bytes | Reserved |
| 00C0 - 00DE | 31 bytes | DMA controller 2 |
| 00E0 - 00EF | 16 bytes | Reserved |
| 00F0 - 00FF | 16 bytes | Arithmetic processor for numerical values |
| 01F0 - 01F7 | 8 bytes | Primary IDE controller |
| 0274 - 0277 | 4 bytes | Reserved (ISA PnP) |
| 0279 - 0279 | 1 byte | Reserved |
| 0290 - 029F | 16 bytes | Hardware monitor |
| 02A0 - 02A7 | 8 bytes | Reserved (T.P Serial Port) |
| 02A8 - 02AF | 8 bytes | Reserved (Serial C) |
| 02B0 - 02B7 | 8 bytes | Reserved (Serial D) |
| 02C0 - 02C7 | 8 bytes | Reserved (Serial E) |
| 02C8 - 02CF | 8 bytes | Reserved (RS422/485 Port) |
| 02F8 - 02FF | 8 bytes | Serial B |
| 0388 - 038D | 6 bytes | Reserved (FM synthesizer) |
| 03B0 - 03BB | 12 bytes | Video (Monochrome) |
| 03C0 - 03DF | 32 bytes | Video (VGA) |
| 03F6 | 1 byte | Primary IDE |
| 03F8 - 03FF | 8 bytes | Serial A |
| 0400 - 04BF | 191bytes | Reserved |
| 04D0 - 04D1 | 2 bytes | Interrupt setting register (Edge/level triggered PIC) |
| 0500 - 051F | 32 bytes | Reserved |
| 0800 - 088F | 143 bytes | Reserved |
| 0A79 - 0A79 | 1 byte | Reserved |
| 0CF8 - 0CFF | 4 bytes | PCI configuration register |
| 0CF9 | 1 byte | Turbo and reset control register |
| 4000 - 400F | 16 byte | Reserved (RAS) |

# Interrupt Level List

**Table 6.2. Hardware Interrupt Levels (Factory Settings)**

| Type | 8259 | Priority | Description | Vector |
|---|---|---|---|---|
| NMI | | High | -I/O CHK | 02H |
| IRQ0 | MASTER | ↑ | Timer 0 | 08H |
| IRQ1 | ” | | System reserved | 09H |
| IRQ2 | ” | | Interrupt controller 2 (slave) | 0AH |
| IRQ8 | SLAVE | | Real-time clock | 70H |
| IRQ9 | ” | | System reserved | 71H |
| IRQ10 | ” | | Not in use (Available for users) *2 | 72H |
| IRQ11 | ” | | Not in use (Available for users) *2 | 73H |
| IRQ12 | ” | | Not in use (Available for users) | 74H |
| IRQ13 | ” | | Co-processor | 75H |
| IRQ14 | ” | | Primary IDE | 76H |
| IRQ15 | ” | | Not in use (Available for users) | 77H |
| IRQ3 | MASTER | | Serial port B (Serial B) | 0BH |
| IRQ4 | ” | | Serial port A (Serial A) | 0CH |
| IRQ5 | ” | | Not in use (Available for users) *1 | 0DH |
| IRQ6 | ” | ↓ | Not in use (Available for users) *2 | 0EH |
| IRQ7 | ” | Low | Not in use (Available for users) *2 | 0FH |

*1 This device is reserved for future enhancement and currently unavailable.

*2 Available as serial port.

# POST Codes

**Table 6.3. POST Codes** ***< 1 / 5 >***

| POST (hex) | Description |
|---|---|
| CFh | Test CMOS R/W functionality. |
| C0h | Early chipset initialization:<br>-Disable shadow RAM<br>-Disable L2 cache (socket 7 or below)<br>-Program basic chipset registers |
| C1h | Detect memory<br>-Auto-detection of DRAM size, type and ECC.<br>-Auto-detection of L2 cache (socket 7 or below) |
| C3h | Expand compressed BIOS code to DRAM |
| C5h | Call chipset hook to copy BIOS back to E000 & F000 shadow RAM. |
| 0h1 | Expand the Xgroup codes locating in physical address 1000:0 |
| 02h | Reserved |
| 03h | Initial Superio_Early_Init switch. |
| 04h | Reserved |
| 05h | 1. Blank out screen<br>2. Clear CMOS error flag |
| 06h | Reserved |
| 07h | Clear 8042 interface<br>Initialize 8042 self-test |
| 08h | Test special keyboard controller for Winbond 977 series Super I/O chips.<br>Enable keyboard interface. |
| 09h | Reserved |
| 0Ah | Disable PS/2 mouse interface (optional).<br>Auto detect ports for keyboard & mouse followed by a port & interface swap (optional).<br>Reset keyboard for Winbond 977 series Super I/O chips. |
| 0Bh | Reserved |
| 0Ch | Reserved |
| 0Dh | Reserved |
| 0Eh | Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker. |
| 0Fh | Reserved |
| 10h | Auto detects flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support. |
| 11h | Reserved |
| 12h | Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override. |
| 13h | Reserved |
| 14h | Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers. |
| 15h | Reserved |
| 16h | Initial Early_Init_Onboard_Generator switch. |
| 17h | Reserved |
| 18h | Detect CPU information including brand, SMI type (Cyrix or Intel®) and CPU level (586 or 686). |
| 19h | Reserved |
| 1Ah | Reserved |
| 1Bh | Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR. |
| 1Ch | Reserved |

**Table 6.3. POST Codes** *< 2 / 5 >*

| POST (hex) | Description |
|---|---|
| 1Dh | Initial EARLY_PM_INIT switch. |
| 1Eh | Reserved |
| 1Fh | Load keyboard matrix (notebook platform) |
| 20h | Reserved |
| 21h | HPM initialization (notebook platform) |
| 22h | Reserved |
| 23h | Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute.<br>Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead.<br>Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information.<br>Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots.<br>Early PCI initialization:<br>-Enumerate PCI bus number<br>-Assign memory & I/O resource<br>-Search for a valid VGA device & VGA BIOS, and put it into C000:0. |
| 24h | Reserved |
| 25h | Reserved |
| 26h | Reserved |
| 27h | Initialize INT 09 buffer |
| 28h | Reserved |
| 29h | Program CPU internal MTRR (P6 & PII) for 0 - 640K memory address.<br>Initialize the APIC for Pentium class CPU.<br>Program early chipset according to CMOS setup. Example: onboard IDE controller.<br>Measure CPU speed.<br>Invoke video BIOS. |
| 2Ah | Reserved |
| 2Bh | Reserved |
| 2Ch | Reserved |
| 2Dh | Initialize multi-language<br>Put information on screen display, including Award title, CPU type, CPU speed …. |
| 2Eh | Reserved |
| 2Fh | Reserved |
| 30h | Reserved |
| 31h | Reserved |
| 32h | Reserved |
| 33h | Reset keyboard except Winbond 977 series Super I/O chips. |
| 34h | Reserved |
| 35h | Reserved |
| 36h | Reserved |
| 37h | Reserved |
| 38h | Reserved |
| 39h | Reserved |
| 3Ah | Reserved |
| 3Bh | Reserved |
| 3Ch | Test 8254 |
| 3Dh | Reserved |
| 3Eh | Test 8259 interrupt mask bits for channel 1. |

**Table 6.3. POST Codes** ***< 3 / 5 >***

| POST (hex) | Description |
|---|---|
| 3Fh | Reserved |
| 40h | Test 8259 interrupt mask bits for channel 2. |
| 41h | Reserved |
| 42h | Reserved |
| 43h | Test 8259 functionality. |
| 44h | Reserved |
| 45h | Reserved |
| 46h | Reserved |
| 47h | Initialize EISA slot |
| 48h | Reserved |
| 49h | Calculate total memory by testing the last double word of each 64K page.<br>Program writes allocation for AMD K5 CPU. |
| 4Ah | Reserved |
| 4Bh | Reserved |
| 4Ch | Reserved |
| 4Dh | Reserved |
| 4Eh | Program MTRR of M1 CPU<br>Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range.<br>Initialize the APIC for P6 class CPU.<br>On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical. |
| 4Fh | Reserved |
| 50h | Initialize USB |
| 51h | Reserved |
| 52h | Test all memory (clear all extended memory to 0) |
| 53h | Reserved |
| 54h | Reserved |
| 55h | Display number of processors (multi-processor platform) |
| 56h | Reserved |
| 57h | Display PnP logo<br>Early ISA PnP initialization<br>-Assign CSN to every ISA PnP device. |
| 58h | Reserved |
| 59h | Initialize the combined Trend Anti-Virus code. |
| 5Ah | Reserved |
| 5Bh | (Optional Feature)<br>Show message for entering AWDFLASH.EXE from FDD (optional) |
| 5Ch | Reserved |
| 5Dh | Initialize Init_Onboard_Super_IO switch.<br>Initialize Init_Onbaord_AUDIO switch. |
| 5Eh | Reserved |
| 5Fh | Reserved |
| 60h | Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility. |
| 61h | Reserved |
| 62h | Reserved |
| 63h | Reserved |
| 64h | Reserved |
| 65h | Initialize PS/2 Mouse |

**Table 6.3. POST Codes** ***< 4 / 5 >***

| POST (hex) | Description |
|---|---|
| 66h | Reserved |
| 67h | Prepare memory size information for function call: INT 15h ax=E820h |
| 68h | Reserved |
| 69h | Turn on L2 cache |
| 6Ah | Reserved |
| 6Bh | Program chipset registers according to items described in Setup & Auto-configuration table. |
| 6Ch | Reserved |
| 6Dh | 1. Assign resources to all ISA PnP devices.<br>2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO". |
| 6Eh | Reserved |
| 6Fh | 1. Initialize floppy controller<br>2. Set up floppy related fields in 40:hardware. |
| 70h | Reserved |
| 71h | Reserved |
| 72h | Reserved |
| 73h | (Optional Feature)<br>Enter AWDFLASH.EXE if :<br>-AWDFLASH is found in floppy drive.<br>-ALT+F2 is pressed |
| 74h | Reserved |
| 75h | Detect & install all IDE devices: HDD, LS120, ZIP, CDROM….. |
| 76h | Reserved |
| 77h | Detect serial ports & parallel ports. |
| 78h | Reserved |
| 79h | Reserved |
| 7Ah | Detect & install co-processor |
| 7Bh | Reserved |
| 7Ch | Reserved |
| 7Dh | Reserved |
| 7Eh | Reserved |
| 7Fh | Switch back to text mode if full screen logo is supported.<br>-If errors occur, report errors & wait for keys<br>-If no errors occur or F1 key is pressed to continue:<br>◆Clear EPA or customization logo. |
| 80h | Reserved |
| 81h | Reserved |
| 82h | 1. Call chipset power management hook.<br>2. Recover the text fond used by EPA logo (not for full screen logo)<br>3. If password is set, ask for password. |
| 83h | Save all data in stack back to CMOS |
| 84h | Initialize ISA PnP boot devices |
| 85h | USB final Initialization<br>NET PC: Build SYSID structure<br>Switch S screen back to text mode<br>Set up ACPI table at top of memory.<br>Invoke ISA adapter ROMs<br>Assign IRQs to PCI devices<br>Initialize APM<br>Clear noise of IRQs. |

**Table 6.3. POST Codes** ***< 5 / 5 >***

| POST (hex) | Description |
|---|---|
| 86h | Reserved |
| 87h | Reserved |
| 88h | Reserved |
| 89h | Reserved |
| 90h | Reserved |
| 91h | Reserved |
| 92h | Reserved |
| 93h | Read HDD boot sector information for Trend Anti-Virus code |
| 94h | Enable L2 cache<br>Program boot up speed<br>Chipset final initialization.<br>Power management final initialization<br>Clear screen & display summary table<br>Program K6 write allocation<br>Program P6 class write combining |
| 95h | Program daylight saving<br>Update keyboard LED & typematic rate |
| 96h | Build MP table<br>Build & update ESCD<br>Set CMOS century to 20h or 19h<br>Load CMOS time into DOS timer tick<br>Build MSIRQ routing table. |
| FFh | Boot attempt (INT 19h) |

# Serial I/O Address and Register Function

The following table lists the I/O addresses in case of Serial A.

**Table 6.4. I/O Address**

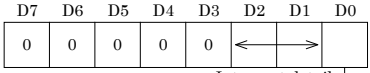
| I/O address | DLAB | Read/Write | Register | |
|---|---|---|---|---|
| 03F8H | 0 | W | Transmitter holding register | THR |
| | | R | Receive buffer register | RBR |
| | 1 | W | Divisor latch register (LSB) | DLL |
| 03F9H | 1 | W | Divisor latch register (MSB) | DLM |
| | 0 | W | Interrupt enable register | IER |
| 03FAH | X | R | Interrupt ID register | IIR |
| 03FBH | X | W | Line control register | LCR |
| 03FCH | X | W | Modem control register | MCR |
| 03FDH | X | R | Line status register | LSR |
| 03FEH | X | R | Modem status register | MSR |
| 03FFH | X | R/W | Scratch register | SCR |

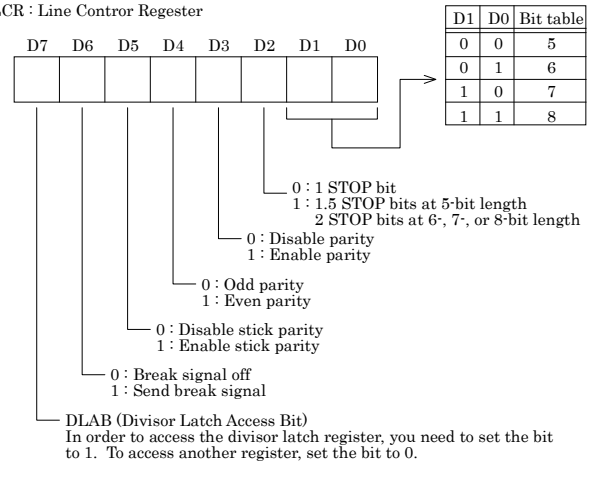
DLAB (Divisor Latch Access Bit) : The value in bit 7 of the line control register.

**Table 6.5. Function of Each Register < *1 / 4* >**

| I/O address | Description |
|---|---|
| 03F8H | THR: Transmitter Holding Register [DLAB=0]<br>D7 D6 D5 D4 D3 D2 D1 D0<br>bit7 MSB ← → bit0 LSB<br>Register dedicated to write transmitted data to |
| 03F8H | RBR: Reciever Buffer Register [DLAB=O]<br>D7 D6 D5 D4 D3 D2 D1 D0<br>bit7 MSB ← → bit0 LSB<br>Register dedicated to read received data from |
| 03F8H | DLL: Divisor Latch (LSB) [DLAB=1]<br>D7 D6 D5 D4 D3 D2 D1 D0<br>bit7 MSB ← → bit0 LSB<br>Baud rate setting register (LSB) |
| 03F9H | DLH: Divisor Latch (MSB) [DLAB=1]<br>D7 D6 D5 D4 D3 D2 D1 D0<br>bit7 MSB ← → bit0 LSB<br>Baud rate setting register (MSB) |
| 03F9H | IER: Interrupt Enable Register [DLAB=0]<br>D7 D6 D5 D4 D3 D2 D1 D0<br>0 0 0 0 EMS ELSI ETHREI ERDAI<br>ERDAI: Received data Interrupt enable<br>ETHREI: Received data register empty Interrupt enable<br>ELSI: Receiver line status Interrupt enable<br>EMS: Modem status interrupt enable [Always used at 0.]<br>1: Enable interrupt<br>0: Disable interrupt |

**Table 6.5. Function of Each Register < *2 / 4* >**

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FAH</td><td>
IIR : Interrupt Identification Register<br>


<table>
<tr><th>bit2</th><th>bit1</th><th>bit0</th><th>Priority</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>——</td><td>Interrupts are not generated.</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1 (high)</td><td>Generated by overrun, parity, framing error or break interrupt.<br>Cleared when the line status register is read.</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>2</td><td>Generated when the receive buffer register is ready.<br>Cleared when the receiving buffer is read.</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>3</td><td>Generated when the transmitter holding register is empty. Cleared when the IIR is read or when transmitted data is written to THR.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>4 (low)</td><td>Modem status interrupt is generated.<br>(CTS, DSR, RI, CD)<br>Cleared when the modem status register is read.</td></tr>
</table>
</td></tr>
<tr><td>03FBH</td><td>
LCR : Line Contror Regester<br>


</td></tr>
</table>

**Table 6.5. Function of Each Register < *3 / 4* >**

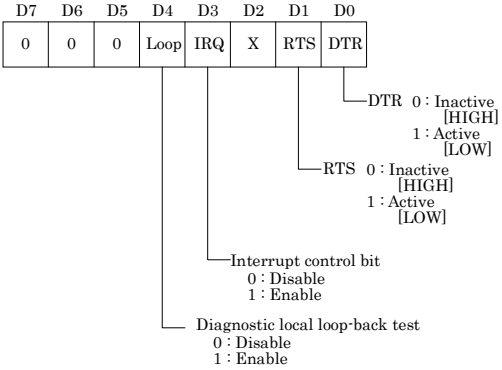
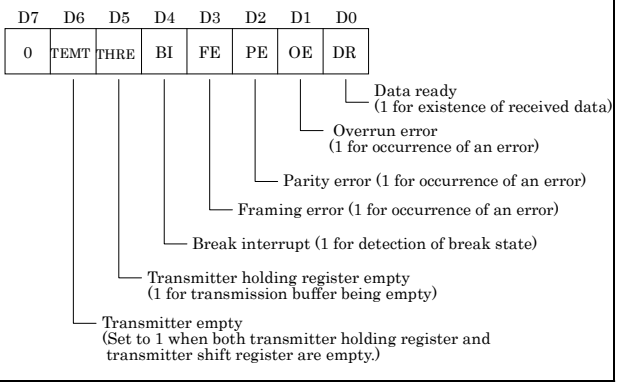
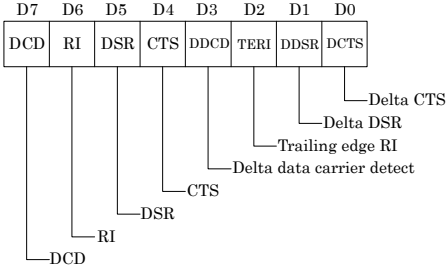
| I/O address | Description |
|---|---|
| 03FCH | MCR: Modem Control Register<br>  <br> |
| 03FDH | LSR: Line Status Regester<br>  <br> |

**Table 6.5. Function of Each Register < *4 / 4* >**

| I/O address | Description |
|---|---|
| 03FEH | MSR : Modem Status Register<br>  |
| 03FFH | SCR : Scratchpad Register<br>This is an 8-bit, readable/writable register which is available to the user to allow data to be saved temporarily. |

Baud Rate Settings

A baud rate is set by software by dividing the clock input (1.8432MHz). The baud rate in terms of hardware can be set to a maximum of 115,200 bps for SERIAL A, B, and C. The baud rates available in practice depend on the operating environment (cable, software, etc.). The table below lists typical baud rates and their respective values to be written to the divisor latch register (LSB, MSB).

**Table 6.6. Baud Rate Settings**

| Baud rate to be set | SERIAL1, 2, 3 Clock input (1.8432MHz) | |
|---|---|---|
| | Value to be set in the divisor register (Decimal) | Setting error (%) |
| 50 | 2304 | --- |
| 75 | 1536 | --- |
| 110 | 1047 | 0.026 |
| 134.5 | 857 | 0.058 |
| 150 | 768 | --- |
| 300 | 384 | --- |
| 600 | 192 | --- |
| 1200 | 96 | --- |
| 1800 | 64 | --- |
| 2000 | 58 | 0.69 |
| 2400 | 48 | --- |
| 3600 | 32 | --- |
| 4800 | 24 | --- |
| 7200 | 16 | --- |
| 9600 | 12 | --- |
| 14400 | 8 | --- |
| 19200 | 6 | --- |
| 28800 | 4 | --- |
| 38400 | 3 | --- |
| 57600 | 2 | --- |
| 76800 | --- | --- |
| 115200 | 1 | --- |
| 153600 | --- | --- |
| 230400 | --- | --- |

Example: To set 9,600 bps, write "00" to the (MSB) divisor latch register and "12 (decimal)" to the (LSB) divisor latch register.

# Watch-Dog-Timer

The watchdog timer serves as a safeguard against possible system lock-up in your industrial computer system. In most industrial environments, there are heavy equipment, generators, high-voltage power lines, or power drops that have adverse effects on your computer system. For instance, when a power drop occurs, it could cause the CPU to come to a halt state or enter into an infinite loop, resulting in a system lock-up.

The application software created by user with the watchdog timer enabled, a RESET automatically generated unless the software periodically triggers the timer within the setting time-out interval. That is, while the system gets hung up, the running program can't trigger the timer periodically. The timer will generate a reset signal to reboot the system.

This feature allows a running program to restart in an orderly way when a power glitch or any abnormal condition occurs.

The watchdog timer comes with 255-level time-out interval, 1 - 255 seconds per interval, which can be adjusted by software setting. There is a tolerance of 2 second for this time-out interval. To maintain the normal system operation, trigger the timer periodically by the user-created program in consideration of the tolerance.

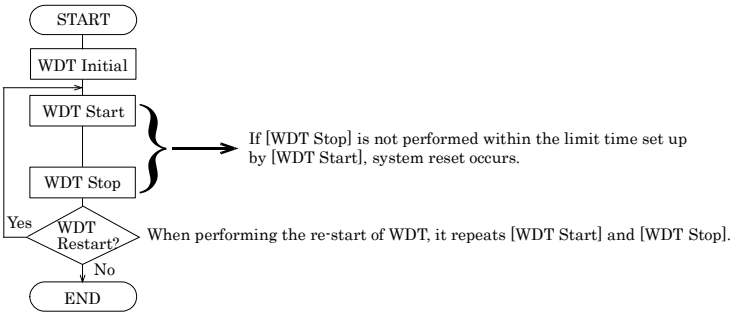
CONTEC's Web site [IPC-SLIB-01], which is bundled with this product, contains a sample program for the watchdog timer. To view the sample program for the watchdog timer, decompress "HWMandRTCut.zip", which is found under \RasUtility\Samples\Module.

Ex.) If the time-out interval is set to 30 seconds, the user-created program must retrigger the watchdog timer before 28 seconds will have elapsed in consideration of the tolerance. If the program failed to retrigger the timer (if 28 - 32 seconds have elapsed), the system will automatically reboot.

The I/O port is defined at address 2e/2fH. You can trigger/enable disable the timer by writing address 2e/2fH.

Here is an example for flow chart and programming how to use the watch-dog-timer.

(1) Example flow chart




* It is also possible not to perform [WDT Stop] instead of performing [WDT Stop] to [WDT Start], but to perform [WDT Start] continuously at the time of a re-start.

(2) Example programming

The following example is written in Intel8086 assembly language.

```
;===============
;<WDT Initial>
;===============
;-----------------------------------------
;Enter the extended function mode
;-----------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-------------------------------------
;Set WDT function at pin89
;-------------------------------------
MOV DX,2EH
MOV AL,2BH
OUT DX,AL
MOV DX,2FH
MOV AL,0DH
OUT DX,AL
;-------------------------------------------------
;Select logical device WDT(number 8)
;-------------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-------------------------------------------------
;Activate logical device WDT(number 8)
;-------------------------------------------------
MOV DX,2EH
MOV AL,30H
OUT DX,AL
MOV DX,2FH
MOV AL,01H
OUT DX,AL
;-------------------------------------
;Set timer unit : second
;-------------------------------------
MOV DX,2EH
MOV AL,F5H
OUT DX,AL
MOV DX,2FH
MOV AL,00H
OUT DX,AL
;-----------------------------------------
;Exit the extended function mode
```

```
;-----------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL

;================================
;<WDT START : counter set and a start >
;================================
;-----------------------------------------
;Enter the extended function mode
;-----------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-----------------------------------------------
;Select logical device WDT(number 8)
;-----------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-----------------------------------------------
;Set time of WDT and start to count down
;-----------------------------------------------
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
;-------------------------------------------------------------------------------
;The data of an example is 15 seconds.(01H=1sec.- FFH=255sec.)
MOV AL,0FH      ; 0FH = 15Sec.
;-------------------------------------------------------------------------------
OUT DX,AL
;-----------------------------------
;Exit the extended function mode
;-----------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL

;==============
;<WDT STOP>
;==============
;-----------------------------------
;Enter the extended function mode
;-----------------------------------
MOV DX,2EH
MOV AL,87H
```

```
OUT DX,AL
OUT DX,AL
;-----------------------------------
;Select logical device WDT(number 8)
;-----------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-----------------------------------
;Stop count down of WDT
;-----------------------------------
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
;-----------------------------------
;The data of 00H is stop WDT
MOV AL,00H
;-----------------------------------
OUT DX,AL
;-----------------------------------
;Exit the extended function mode
;-----------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

⚠ CAUTION

The timer's intervals have a tolerance of ±2 seconds.

# Life of CF

About write endurance

CF contained in BX-110n-DCx3xx-C01 has a write endurance which limits the number of times each memory may be written, due to the characteristic of the memory that is used. Write endurance can be calculated by the following formula as a reference value:

Write endurance (cycles) =
Total capacity (MB) x 100,000 (cycles) / Size of file (MB)

Example1: When the file of 1MB is made for the standard CF (2GB), and it rewrites it once a second.
Write endurance = 1920MB x 100,000 cycles / 1MB = 192,000,000 (cycles)
Longevity = 192,000,000 / (3600 x 24 x 365) ≅ 6 (year)

After all these are reference values, confirm its life span by the following S.M.A.R.T.

About S.M.A.R.T.

A self-diagnosis program "SMART" that can obtain the S.M.A.R.T information in a SSD is available for download at TDK website (http://www.tdk.co.jp). Following information can be obtained using this program:

1. Number of flash memory chips mounted inside SSD, and the total number of blocks
2. Total number of write cycles on SSD
3. Number of write cycles of the block where rewriting occurs most frequently
4. Number of write cycles of the block where rewriting occurs least frequently
5. Number of write cycles of all the blocks (10 step histogram)

The NAND type flash memory's life span is 100,000 cycles. The number of write cycles for each block can be determined, making it possible to predict life span.

TDK website:

http://www.tdk.co.jp

At the SMART program download destination:
http://www.tdk.co.jp/memorycontroller/mem01000.htm

Requirement for SMART program:

Windows 7/2000/XP with VB6.0 runtime and MSFLXGRD.OCX component

(Such as vb6rt330.exe)

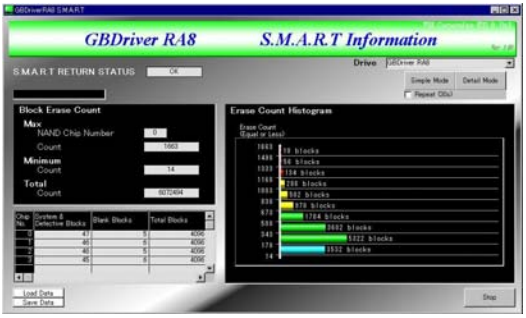



**Figure 6.2 S.M.A.R.T.**

# Battery

Battery Specification

This product uses the following battery.

- Type : Lithium primary battery
- Model : BR-1/2AA
- Maker : Panasonic
- Nominal voltage : 3V
- Nominal capacity : 1000mAh
- Lithium content : 1g or less

Removing the battery

Remove the battery according to the following figure.

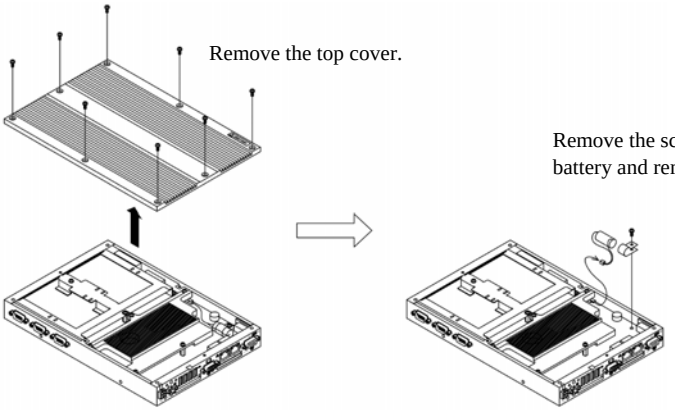



**Figure 6.2 Removing the battery**

Disposing the battery

Dispose the removed battery properly as instructed by local government.

# 7. List of Options

< Common >

AC adapter

- IPC-ACAP12-04 *1 AC adapter (Input: 100-240VAC, Output: 12VDC 4A)

*1 The AC adaptor can not be fixed to a BX-110n body using the attached bracket.

Bracket

- BX-BKT-VESA02 Bracket for VESA (“75 x 75”, “100 x 100”)

CF Card

- CF-1GB-B 1GB CompactFlash for Fix Disk
- CF-2GB-B 2GB CompactFlash for Fix Disk
- CF-4GB-B 4GB CompactFlash for Fix Disk
- CF-8GB-B 8GB CompactFlash for Fix Disk

Hard Disk

- PC-HDD80S SATA HDD 80GB

Silicon Disk

- PC-SSD2000S SATA SSD 2GB
- PC-SSD4000S SATA SSD 4GB
- PC-SSD8000S SATA SSD 8GB

TFT color liquid-crystal display

< Analog RGB types >

- FPD-H21XT-AC (15 inch 1024 x 768 dots, Panel mounted type)
- FPD-L21ST-AC (12.1 inch 800 x 600 dots, Panel mounted type)
- FPD-M21VT-AC (10.4 inch 640 x 480 dots, Panel mounted type)

PCI Bus Expansion Chassis

- ECH-PCI-CE-H2C Short-type two PCI bus boards can be connected.

*2 A CB-CE-1 or CB-CE-3 PCI express cable is required separately.

Cable for Cable Express *3

- CB-CE-1 Cable Express Cable (1m)
- CB-CE-3 Cable Express Cable (3m)

*3 This cable is for connecting to the CONTEC’s expansion chassis of PCI Express Cable modes.
The following enhancing chassis can be connected.
ECH-PCI-CE-H2B, ECH-PCI-CE-H2C, ECH-PCI-CE-F2B, ECH-PCI-CE-H4B, ECH-PCI-CE-F4B, ECH-PCI-CE-H4A, E
CH-PCI-CE-H7A, ECH-PCI-CE-H13A, ECH-PE-CE-H2B, ECH-PE-CE-F2B

# BX-110n Series

## User's Manual

BX-110n-DCxxxx-C01

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